STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

DAVID MCCOY
SECRETARY

April 4, 2005

U.S. Army Corp of Engineers
Regulatory Field Office
6508 Falls of the Neuse Road
Suite 120
Raleigh, NC 27615

ATTN: Mr. John T. Thomas
NCDOT Coordinator

Subject: **Nationwide 6, 23 and 33 Permit Application** for the Replacement of Bridge No. 38 on NC 18, over Crab Creek in Alleghany County. State Project No. 8.1701201, Federal Aid Project No. BRSTP-18 (8), WBS Element 33375.1.1, Division 11, TIP No. B-4007

Dear Sir:

Please find enclosed three copies of the Categorical Exclusion (CE) Document, Pre-construction Notification (PCN), design plan sheets, permit drawings, EEP Confirmation letter, and NCDOT Geotechnical letter. The North Carolina Department of Transportation (NCDOT) proposes to conduct geotechnical foundation investigation for the above-mentioned project. Following the investigation, NCDOT proposes to replace the 136-foot Bridge No. 38 over Crab Creek with a two span 165-foot pre-stressed box beam bridge over the existing alignment. The cross section of the travel way across the new structure includes two 12-foot lanes with 3-foot shoulders on each side. The proposed approach roadway will provide two 12-foot lanes with 8-foot shoulders on each side.

Geotechnical investigations will necessitate up to 10 borings, two of which will be in or near Crab Creek. The resulting maximum impact will be less than 0.001 acres (eight square feet) of temporary fill in Crab Creek.

Construction of the new bridge will be done in two phases using a temporary causeway. The causeway will be used for demolition of the existing bridge and construction on the new bridge. Traffic will be maintained onsite by a temporary bridge detour. There will be 0.01 acre of permanent wetland impacts and 0.007 acres of temporary surface water fill for the causeway. There will be 0.013 acre of temporary fill in wetlands due to the temporary bridge detour. There will be an in-water work moratorium and land disturbance activities will be prohibited within 25 feet of Crab Creek from October 15 to April 15 to protect trout spawning.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-715-1500
FAX: 919-715-1501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD
PLB SUITE 168
RALEIGH, NC 27604

IMPACTS TO WATERS OF THE UNITED STATES

The project study area is located within the subbasin 05-07-03 of the New River Basin and is part of U.S. Geologic Survey (USGS) hydrologic unit 05050001. Crab Creek originates south of NC 18 near SR 1444 (Glade Valley Road) in Alleghany County and flows north to its confluence with the Little River northwest of the project study area. The North Carolina Division of Water Quality (NCDWQ) Stream Index Number (SIN) is 10-9-12 from its source to the Little River. The channel of Crab Creek ranges from 12 to 30 feet in width with a bankfull depth of approximately 24 to 30 inches. The substrate consists of sand, gravel, and cobble. Crab Creek has been assigned a NCDWQ Best Usage Classification of **C Tr** and is a Designated Public Mountain Trout Water (DPMTW) according to North Carolina Wildlife Resources Commission (NCWRC). No Outstanding Resource Waters (ORW), WS-I, or WS-II Waters occur within 3.0 miles of the project study area. High Quality Waters (HQW) occur in the Little River (SIN 10-9-11.5) approximately 1.0 mile downstream of the project study area. The HQW designation indicates waters that are rated as excellent based on biological and physical/chemical characteristics.

Crab Creek is not listed on the 2002 List of Impaired Waters [303(d)] for the New River Basin, nor is Crab Creek designated as a National Wild and Scenic River or a North Carolina Natural and Scenic River.

There are two riverine wetlands located within the project study area. Wetland 1 (W1) is approximately 0.01 acre and Wetland 2 (W2) is approximately 0.03 acre. Both exhibit characteristics of palustrine, scrub-shrub assemblage (PSS) (Cowardin *et. al.* 1979).

Permanent Impacts:
Surface Water: There will be no permanent impacts to Crab Creek.

Wetland: The replacement of Bridge No. 38 will result in 0.01 acre of permanent impacts to W1 and W2 due to mechanized clearing activities outside of the temporary detour. These impacts include 0.002 acre of mechanized clearing to W1 (Site No. 3) and 0.008 acre of mechanized clearing to W2 (Site No. 4).

Temporary Impacts:
Surface Water: Crab Creek will be impacted by a temporary causeway installed during two phases. Phase I, consisting of 0.002 acre of temporary fill (Site No. 1), will be used during demolition of the existing bridge. Phase II, consisting of 0.005 acre of temporary fill (Site No. 2), will be used during construction.

Wetland: The temporary detour bridge will include 0.013 acre of temporary fill in wetlands. This consists of 0.004 acre to Site No. 3 and 0.009 acre to Site No. 4.

Geotechnical Investigations: A consultant will be conducting an investigation for the foundation with up to 10 borings; 6 borings for the main structure and 4 borings for the detour structure. Only 2 of the borings will be in or near Crab Creek and will be drilled through the deck of the existing bridge (see attached letter dated March 23, 2005). The temporary impacts that may occur for these two borings are 4 sq. ft. each for a total disturbance area of 8 sq. ft. All borings will fall within the footprint of the proposed structures. No borings will be performed outside of the proposed construction limits or within any wetland boundaries.

Utility Impacts: No water or sewer utilities are located within the project study area.

Bridge Demolition: The superstructure consists of concrete deck, curbing and girders. The substructure consists of two concrete interior bents located within the stream channel. Due to the presence of concrete in the superstructure and substructure of the bridge, the potential exists for approximately 72 cubic yards of temporary fill in Crab Creek. However, these components are slated for a removal in a manner which will avoid dropping any component into Crab Creek. Best Management Practices for Bridge Demolition and Removal (BMPs-BDR) will be adhered to during construction. Heavy equipment must be operated from the banks rather than in the stream channel in order to minimize sediment and reduce the likelihood of introducing other pollutants into the stream. After construction activities are completed, abandoned approaches associated with the existing structure and/or temporary detours will be removed and revegetated in accordance with NCDOT guidelines.

Schedule: Geotechnical investigations in Waters of the U.S. will begin as soon as a Nationwide Permit 6 is issued for this project. The project is scheduled for a letting date on December 20, 2005 with a date of availability on January 31, 2006. It is anticipated that the contractor will begin construction in January.

Restoration Plan: Following construction of the bridge, all material used in the construction of the structure will be removed. The existing approach fill will be removed to natural grade and the area will be revegetated according to NCDOT guidelines. Class I riprap and filter fabric will be used for bank stabilization. Pre-project elevations will be restored. NCDOT will restore the stream and wetland areas to pre-project contours. Fill areas for temporary detour will be restored back to natural conditions.

Removal and Disposal Plan: The contractor will be required to submit a reclamation plan for removal and disposal of all material off-site at an upland location. The contractor will use excavation equipment for removal of any earthen material. The material used for installation of the temporary causeway within the surface waters will be removed after the new bridge is built. The temporary fill areas will be restored to their original contours and replanted with native species. After the temporary detour is no longer needed, the contractor will remove all material placed within the wetland areas. All material will become the property of the contractor.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 29, 2003 United States Fish and Wildlife Service (USFWS) lists one federally protected species for Alleghany County, the bog turtle (*Clemmys muhlenbergii*). The bog turtle is listed as Threatened due to Similarity of Appearance [T(S/A)]. T(S/A) species are not subject to Section 7 consultation and a biological conclusion is not required. However, this project is not expected to affect the bog turtle due to lack of suitable habitat within the project study area, with wooded wetlands rather than open and herbaceous-dominated wetlands, and the channel present within the project study area is course-bottomed rather than soft-bottomed.

AVOIDANCE AND MINIMIZATION

Despite the minimization strategies employed for the proposed project, the resulting permanent wetland impacts will be 0.01 acre. Consequently, the project will require compensatory mitigation.

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.
According to the Clean Water Act (CWA) Section 404(b)(1) guidelines, NCDOT must avoid, minimize, and mitigate, in sequential order, impacts to Waters of the U.S. The following is a list of the project's jurisdictional stream avoidance/minimization activities proposed or completed by NCDOT:

Avoidance/Minimization:

- The new bridge will not have bents located in the water.
- The new bridge will be 29 feet longer than the existing bridge.
- Limited in-stream activity.
- This project requires Design Standards for Sensitive Watersheds due to being within trout waters.
- Crab Creek is a Designated Public Mountain Trout Water (DPMTW); therefore no work in or within 25 feet of the water will be allowed at all during the moratorium period of October 15 through April 15.
- Fill slopes are 2:1 to avoid fill in the stream.

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in jurisdictional Waters of the United States, and that the proposed action includes all practicable methods to avoid and/or minimize jurisdictional wetland impacts that may result from such use.

Compensation: Based upon agreements stipulated in the "Memorandum of Agreement Among the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U.S. Army Corps of Engineers, Wilmington District" (MOA), it is understood that the North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (EEP), will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for NCDOT projects that are listed in Exhibit 1 of the subject MOA during the EEP transition period which ends on June 30, 2005.

Since the subject project is listed in Exhibit 1, the remaining necessary compensatory mitigation to offset unavoidable impacts to waters that are jurisdictional under the federal Clean Water Act will be provided by the EEP. An acceptance letter dated March 16, 2005 from EEP is attached. The offsetting mitigation will derive from an inventory of assets already in existence within the same 8-digit cataloguing unit. The Department has avoided and minimized impacts to jurisdictional resources to the greatest extent possible as described above. The unavoidable permanent impacts to 0.01 acre of a jurisdictional wetland will be offset by compensatory mitigation provided by the EEP program. See attached confirmation letter from EEP.

REGULATORY APPROVALS

Section 404 Permit: The project has been processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR 771.115(b). The NCDOT requests that these activities be authorized by a Nationwide Permit 23 (67 FR 2020; January 15, 2002). We are requesting the issuance of a Nationwide Permit 33 for the temporary causeway associated with bridge removal and construction within Crab Creek. Also, NCDOT requests that the borings from the foundation investigation be authorized by a Nationwide Permit 6.

Section 401 Permit: We anticipate 401 General Certification numbers 3494, 3403, and 3366 will apply to this project. All general conditions of the Water Quality Certifications will be met. Therefore, in accordance with 15A NCAC 2H, Section .0500(a) and 15A NCAC 2B.0200 we are providing two copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their notification.

Thank you for your assistance with this project. A copy of this permit application will be posted on the NCDOT website at: http://www.ncdot.org/planning/pe/naturalunit/Permit.html. If you have any questions or need additional information, please contact Ms. Deanna Riffey, NCDOT – Office of Natural Environment, at (919) 715-1409 or driffey@dot.state.nc.us.

Sincerely,

Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

Cc:

w/attachment

Mr. John Hennessy, Division of Water Quality (2 copies)
Ms. Marla Chambers, NCWRC
Ms. Marella Buncick, USFWS
Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. Michael A. Pettyjohn, P.E.
Mr. Heath Slaughter, DEO
Mr. Njoroge W. Wainaina, State Engineering Geologist, P.E., Geotechnical Unit

w/o attachment

Mr. Jay Bennett, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Derrick Weaver, PDEA
Mr. David Franklin, USACE, Wilmington
Ms. Beth Harmon, EEP
Ms. Laurie P. Smith, CPA, NCDOT, Program Management

Office Use Only: Form Version May 2002

USACE Action ID No. _____ **DWQ No.** _____

(If any particular item is not applicable to this project, please enter "Not Applicable" or "N/A".)

I. Processing

1. Check all of the approval(s) requested for this project:
   - ☒ Section 404 Permit
   - ☐ Section 10 Permit
   - ☐ 401 Water Quality Certification
   - ☐ Riparian or Watershed Buffer Rules
   - ☐ Isolated Wetland Permit from DWQ

2. Nationwide, Regional or General Permit Number(s) Requested: Nationwide 6, 23 and 33

3. If this notification is solely a courtesy copy because written approval for the 401 Certification is not required, check here: ☒

4. If payment into the North Carolina Wetlands Restoration Program (NCWRP) is proposed for mitigation of impacts (verify availability with NCWRP prior to submittal of PCN), complete section VIII and check here: ☐

5. If your project is located in any of North Carolina's twenty coastal counties (listed on page 4), and the project is within a North Carolina Division of Coastal Management Area of Environmental Concern (see the top of page 2 for further details), check here: ☐

II. Applicant Information

1. Owner/Applicant Information
   Name: North Carolina Department of Transportation (NCDOT)
   Mailing Address: Project Development and Environmental Analysis
   1598 Mail Service Center
   Raleigh, NC 27699-1598

   Telephone Number: 919-733-3141 Fax Number: 919-733-9794
   E-mail Address: gthorpe@dot.state.nc.us

2. Agent/Consultant Information (A signed and dated copy of the Agent Authorization letter must be attached if the Agent has signatory authority for the owner/applicant.)
   Name: _____
   Company Affiliation: _____
   Mailing Address: _____

   Telephone Number: _____ Fax Number: _____
   E-mail Address: _____

III. Project Information

Attach a **vicinity map** clearly showing the location of the property with respect to local landmarks such as towns, rivers, and roads. Also provide a detailed **site plan** showing property boundaries and development plans in relation to surrounding properties. Both the vicinity map and site plan must include a scale and north arrow. The specific footprints of all buildings, impervious surfaces, or other facilities must be included. If possible, the maps and plans should include the appropriate USGS Topographic Quad Map and NRCS Soil Survey with the property boundaries outlined. Plan drawings, or other maps may be included at the applicant's discretion, so long as the property is clearly defined. For administrative and distribution purposes, the USACE requires information to be submitted on sheets no larger than 11 by 17-inch format; however, DWQ may accept paperwork of any size. DWQ prefers full-size construction drawings rather than a sequential sheet version of the full-size plans. If full-size plans are reduced to a small scale such that the final version is illegible, the applicant will be informed that the project has been placed on hold until decipherable maps are provided.

1. Name of project: Replacement of Bridge No. 38 on NC 18, over Crab Creek

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4007

3. Property Identification Number (Tax PIN): N/A

4. Location
   County: Alleghany Nearest Town: Ennice
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers, landmarks, etc.):
   Bridge No. 38 on NC 18, approximately 0.3 mile west of the junction of SR 1450 (Green Road) (please refer to attached maps)

5. Site coordinates, if available (UTM or Lat/Long): 36° 32'57.92"N / 81° 0'9.31"W
   (Note – If project is linear, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)

6. Property size (acres): Study area was approximately 15 acres. Actual area of impact is much less. Please refer to attached drawings.

7. Nearest body of water (stream/river/sound/ocean/lake): Crab Creek

8. River Basin: New River
   (Note – this must be one of North Carolina's seventeen designated major river basins. The River Basin map is available at http://h2o.enr.state.nc.us/admin/maps/.)

9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: Project area is mountainous, with a mixture of residential areas, forest vegetation, agricultural fields and a maintained right-of-way.

10. Describe the overall project in detail, including the type of equipment to be used: Replace Bridge No. 38 over Crab Creek with a new bridge. The new bridge will be 165 feet long and 30 feet wide. The cross section includes two 12-foot lanes and 3-foot shoulders on each side. The approach roadway will provide two12-foot lanes with 8-foot shoulders on each side. Traffic will be detoured on-site during construction, with the temporary bridge located 340 feet south of the existing bridge. Construction equipment will consist of heavy duty trucks, earth moving equipment, cranes, etc.

11. Explain the purpose of the proposed work: Bridge No. 38 is considered structurally deficient and functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

IV. Prior Project History

If jurisdictional determinations and/or permits have been requested and/or obtained for this project (including all prior phases of the same subdivision) in the past, please explain. Include the USACE Action ID Number, DWQ Project Number, application date, and date permits and certifications were issued or withdrawn. Provide photocopies of previously issued permits, certifications or other useful information. Describe previously approved wetland, stream and buffer impacts, along with associated mitigation (where applicable). If this is a NCDOT project, list and describe permits issued for prior segments of the same T.I.P. project, along with construction schedules.

N/A

V. Future Project Plans

Are any future permit requests anticipated for this project? If so, describe the anticipated work, and provide justification for the exclusion of this work from the current application.

N/A

VI. Proposed Impacts to Waters of the United States/Waters of the State

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. The applicant must also provide justification for these impacts in Section VII below. All proposed impacts, permanent and temporary, must be listed herein, and must be clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) must be shown on a delineation map, whether or not impacts are proposed to these systems. Wetland and stream evaluation and delineation forms should be included as appropriate. Photographs may be included at the applicant's discretion. If this proposed impact is strictly for wetland or stream mitigation, list and describe the impact in Section VIII below. If additional space is needed for listing or description, please attach a separate sheet.

1. Provide a written description of the proposed impacts: The replacement of the bridge will result in 0.007 acre of temporary fill within the stream channel of Crab Creek. Two borings will occur in or near Crab Creek and will be drilled through the deck of the existing

bridge. The temporary impacts that may occur for these two borings total < 0.001 acre. Two wetlands are located within the project study area and are referred to as W1 and W2. Impacts to wetlands will result in 0.013 acre of temporary fill and 0.01 acre of permanent disturbance due to mechanized clearing. The tables below display "(T)" if impacts are temporary in nature.

2. Individually list wetland impacts below:

Wetland Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)	Located within 100-year Floodplain** (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland***
14+53-DET-Lt	Fill (T) to W1	0.004	no	Approx. 10 ft	Riverine
14+53-DET-Lt	Mech. Clearing to W1	0.002	no	Approx. 10 ft	Riverine
16+24-DET-Lt	Fill (T) to W2	0.009	no	Approx. 10 ft	Riverine
16+24-DET-Lt	Mech. Clearing to W2	0.008	no	Approx. 10 ft	Riverine

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: mechanized clearing, grading, fill, excavation, flooding, ditching/drainage, etc. For dams, separately list impacts due to both structure and flooding.

** 100-Year floodplains are identified through the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM), or FEMA-approved local floodplain maps. Maps are available through the FEMA Map Service Center at 1-800-358-9616, or online at http://www.fema.gov.

*** List a wetland type that best describes wetland to be impacted (e.g., freshwater/saltwater marsh, forested wetland, beaver pond, Carolina Bay, bog, etc.) Indicate if wetland is isolated (determination of isolation to be made by USACE only).

List the total acreage (estimated) of all existing wetlands on the property: 0.04 acre
Total area of wetland impact proposed: 0.02 acre

3. Individually list all intermittent and perennial stream impacts below:

Stream Impact Site Number (indicate on map)	Type of Impact*	Length of Impact (linear feet)	Stream Name**	Average Width of Stream Before Impact	Perennial or Intermittent? (please specify)
16+92-L-Lt	Fill (T)	0.002 acre	Crab Creek	12-30 feet	Perennial
17+19-L-Lt	Fill (T)	0.005 acre	Crab Creek	12-30 feet	Perennial
Site 1	Boring (T)	<0.001 acre	Crab Creek	12-30 feet	Perennial
Site 1	Boring (T)	<0.001 acre	Crab Creek	12-30 feet	Perennial

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: culverts and associated rip-rap, dams (separately list impacts due to both structure and flooding), relocation (include linear feet before and after, and net loss/gain), stabilization activities (cement wall, rip-rap, crib wall, gabions, etc.), excavation, ditching/straightening, etc. If stream relocation is proposed, plans and profiles showing the linear footprint for both the original and relocated streams must be included.

** Stream names can be found on USGS topographic maps. If a stream has no name, list as UT (unnamed tributary) to the nearest downstream named stream into which it flows. USGS maps are available through the USGS at 1-800-358-9616, or online at www.usgs.gov. Several internet sites also allow direct download and printing of USGS maps (e.g., www.topozone.com, www.mapquest.com, etc.).

Cumulative impacts (linear distance in feet) to all streams on site: 0.007 ac

4. Individually list all open water impacts (including lakes, ponds, estuaries, sounds, Atlantic Ocean and any other water of the U.S.) below:

Open Water Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)	Name of Waterbody (if applicable)	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)
N/A				

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: fill, excavation, dredging, flooding, drainage, bulkheads, etc.

5. Pond Creation
   If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
   Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
   Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.):_____
   _____
   Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.):_____
   _____
   Size of watershed draining to pond:_____ Expected pond surface area:_____

VII. Impact Justification (Avoidance and Minimization)

Specifically describe measures taken to avoid the proposed impacts. It may be useful to provide information related to site constraints such as topography, building ordinances, accessibility, and financial viability of the project. The applicant may attach drawings of alternative, lower-impact site layouts, and explain why these design options were not feasible. Also discuss how impacts were minimized once the desired site plan was developed. If applicable, discuss construction techniques to be followed during construction to reduce impacts.

The new bridge will not have bents located in the water. The new bridge will be 29 feet longer than the existing bridge. This project requires Design Standards for Sensitive Watersheds due to being within trout waters. Crab Creek is a Designated Public Mountain Trout Water (DPMTW), therefore no work in or within 25 feet of the water will be allowed at all during the moratorium period of October 15 through April 15. There will be limited in-stream activity. Fill slopes will be 2:1 to avoid fill in the stream.

VIII. Mitigation

DWQ - In accordance with 15A NCAC 2H .0500, mitigation may be required by the NC Division of Water Quality for projects involving greater than or equal to one acre of impacts to freshwater wetlands or greater than or equal to 150 linear feet of total impacts to perennial streams.

USACE – In accordance with the Final Notice of Issuance and Modification of Nationwide Permits, published in the Federal Register on March 9, 2000, mitigation will be required when necessary to ensure that adverse effects to the aquatic environment are minimal. Factors including size and type of proposed impact and function and relative value of the impacted aquatic resource will be considered in determining acceptability of appropriate and practicable mitigation as proposed. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland and/or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferable in the same watershed.

If mitigation is required for this project, a copy of the mitigation plan must be attached in order for USACE or DWQ to consider the application complete for processing. Any application lacking a required mitigation plan or NCWRP concurrence shall be placed on hold as incomplete. An applicant may also choose to review the current guidelines for stream restoration in DWQ's Draft Technical Guide for Stream Work in North Carolina, available at http://h2o.enr.state.nc.us/ncwetlands/strmgide.html.

1. Provide a brief description of the proposed mitigation plan. The description should provide as much information as possible, including, but not limited to: site location (attach directions and/or map, if offsite), affected stream and river basin, type and amount (acreage/linear feet) of mitigation proposed (restoration, enhancement, creation, or preservation), a plan view, preservation mechanism (e.g., deed restrictions, conservation easement, etc.), and a description of the current site conditions and proposed method of construction. Please attach a separate sheet if more space is needed.
   Compensatory mitigation will be required for this project due to the mechanized clearing of 0.01 acre. Other impacts are temporary in nature; therefore, no compensatory mitigation is proposed for the temporary causeway in Crab Creek or temporary fill in wetlands due to the on-site detour.

2. Mitigation may also be made by payment into the North Carolina Wetlands Restoration Program (NCWRP). Please note it is the applicant's responsibility to contact the NCWRP at (919) 733-5208 to determine availability and to request written approval of mitigation prior to submittal of a PCN. For additional information regarding the application process for the NCWRP, check the NCWRP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCWRP is proposed, please check the appropriate box on page three and provide the following information:

Amount of stream mitigation requested (linear feet):_____
Amount of buffer mitigation requested (square feet):_____
Amount of Riparian wetland mitigation requested (acres): 0.01 ac
Amount of Non-riparian wetland mitigation requested (acres):_____
Amount of Coastal wetland mitigation requested (acres):_____

IX. Environmental Documentation (required by DWQ)

Does the project involve an expenditure of public (federal/state) funds or the use of public (federal/state) land?

Yes ☒ No ☐

If yes, does the project require preparation of an environmental document pursuant to the requirements of the National or North Carolina Environmental Policy Act (NEPA/SEPA)? Note: If you are not sure whether a NEPA/SEPA document is required, call the SEPA coordinator at (919) 733-5083 to review current thresholds for environmental documentation.

Yes ☒ No ☐

If yes, has the document review been finalized by the State Clearinghouse? If so, please attach a copy of the NEPA or SEPA final approval letter.

Yes ☒ No ☐

X. Proposed Impacts on Riparian and Watershed Buffers (required by DWQ)

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to required state and local buffers associated with the project. The applicant must also provide justification for these impacts in Section VII above. All proposed impacts must be listed herein, and must be clearly identifiable on the accompanying site plan. All buffers must be shown on a map, whether or not impacts are proposed to the buffers. Correspondence from the DWQ Regional Office may be included as appropriate. Photographs may also be included at the applicant's discretion.

Will the project impact protected riparian buffers identified within 15A NCAC 2B .0233 (Neuse), 15A NCAC 2B .0259 (Tar-Pamlico), 15A NCAC 2B .0250 (Randleman Rules and Water Supply Buffer Requirements), or other (please identify_____)?

Yes ☐ No ☒ If you answered "yes", provide the following information:

Identify the square feet and acreage of impact to each zone of the riparian buffers. If buffer mitigation is required calculate the required amount of mitigation by applying the buffer multipliers.

Zone*	Impact (square feet)	Multiplier	Required Mitigation
1		3	
2		1.5	
Total			

* Zone 1 extends out 30 feet perpendicular from near bank of channel; Zone 2 extends an additional 20 feet from the edge of Zone 1.

If buffer mitigation is required, please discuss what type of mitigation is proposed (i.e., Donation of Property, Conservation Easement, Riparian Buffer Restoration / Enhancement, Preservation or Payment into the Riparian Buffer Restoration Fund). Please attach all appropriate information as identified within 15A NCAC 2B .0242 or .0260.
N/A

XI. Stormwater (required by DWQ)

Describe impervious acreage (both existing and proposed) versus total acreage on the site. Discuss stormwater controls proposed in order to protect surface waters and wetlands downstream from the property.
N/A

XII. Sewage Disposal (required by DWQ)

Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility.
N/A

XIII. Violations (required by DWQ)

Is this site in violation of DWQ Wetland Rules (15A NCAC 2H .0500) or any Buffer Rules?
Yes ☐ No ☒

Is this an after-the-fact permit application?
Yes ☐ No ☒

XIV. Other Circumstances (Optional):

It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g., draw-down schedules for lakes, dates associated with Endangered and Threatened Species, accessibility problems, or other issues outside of the applicant's control).
This project has a work moratorium from October 15 to April 15 that prohibits in-water work as well as any land disturbance within 25 feet of Crab Creek.

Applicant/Agent's Signature — Date: 4/6/05

(Agent's signature is valid only if an authorization letter from the applicant is provided.)

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 23, 2005

Memorandum to: Ms. Elizabeth Lusk
Environmental Supervisor
Office of Natural Environment

Attention: Deanna Riffey
Environmental Specialist

Project Number: 33375.1.1
TIP Number: B-4007
F.A. Number: BRSTP-18(8)
County: Alleghany
Project Description: Bridge No. 38 over Crab Creek on NC 18
Subject: Information for permit request

The Geotechnical Engineering Unit is in the process of planning a foundation investigation for the above referenced project. A consultant will be conducting the investigation with up to 10 borings; 6 borings for the main structure, 4 borings for the detour structure. Only 2 borings will be in or near the waters of Crab Creek. Both of these borings will be drilled through the deck of the existing bridge. The location of each boring is as follows:

Boring Designation	Station	Offset
EB1-A	16+30	16' Lt
EB1-B	16+12	16' Rt
B1-A	17+23	12' Lt
B1-B	17+09	12' Rt
EB2-A	17+95	16' Lt
EB2-B	17+77	16' Rt
DET-1	13+00	14' Lt
DET-2	12+76	14' Rt
DET-3	14+23	14' Lt
DET-4	13+99	14' Rt

All the borings will be drilled utilizing a drill mounted on an ATV (All Terrain Vehicle) or a Drill Truck. These borings all fall within the footprint of the proposed structures. No borings will be performed outside the proposed construction limits or within any wetland boundaries.

The size of the borings are approximately 0.5ft (6 in.) in diameter. The area that may be disturbed per boring is estimated to be 4 Ft^2, for a total disturbance area of 8 Ft^2 in or near Crab Creek. The consultant will use casing to advance the borings and rotary-wash techniques while recirculating the drilling fluids between the drilling tub and the inside of the casing. This will isolate the drilling water and cuttings and contain them in the boring and the drilling tub. The borings will be backfilled with the cuttings and then sealed with bentonite hole plug. The excess drill cuttings will be disposed of in the upland areas away from Crab Creek.

The field activities are expected to take 5 days total

If you have any questions or need any additional information, please contact David Hering at 250-4088.

Sincerely,

David Hering
Geotechnical Investigations Supervisor
Geotechnical Consultant Coordination

cc:
John Pilipchuk, LG, PE – Geotechnical Engineering Unit
File

Ecosystem Enhancement PROGRAM

March 16, 2005

Mr. Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

B-4007, Bridge 38 over Crab Creek on NC 18, Alleghany County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide riverine wetland mitigation for the subject project. Based on the information supplied by you in a letter dated February 10, 2005, the impacts are located in CU 05050001 of the New River Basin in the Northern Mountains (NM) Eco-Region, and are as follows:

Riverine Wetland Impacts: 0.01 acre

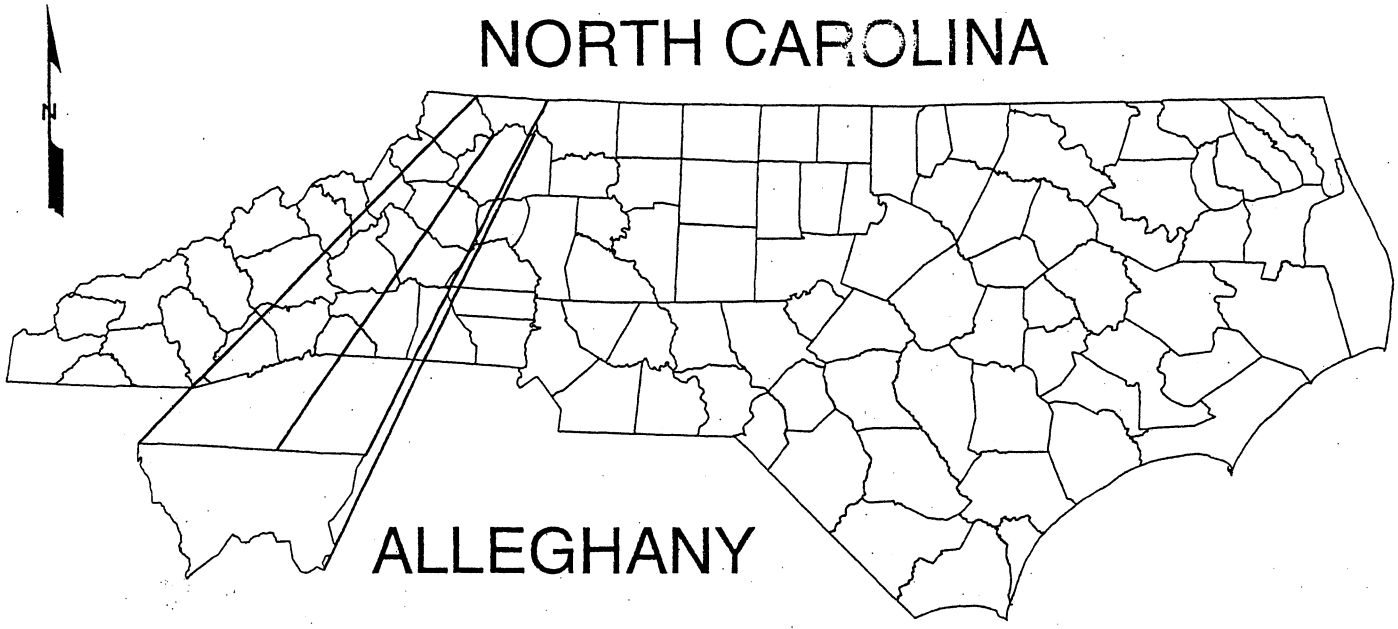
As stated in your letter, the subject project is listed in Exhibit 2 of the Memorandum of Agreement among the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, Wilmington District dated July 22, 2003. The mitigation for the subject project will be provided in accordance with this agreement.

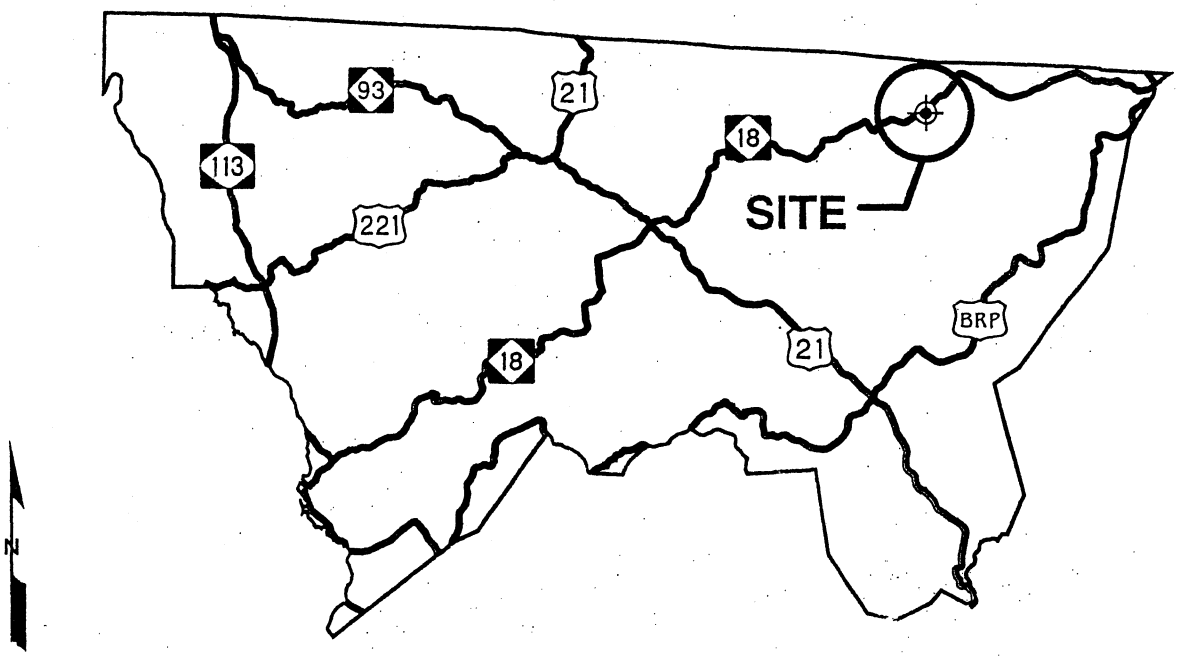
If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

William D. Gilmore, P.E.
EEP Director

cc: Mr. John Thomas, USACE-Raleigh
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: B-4007



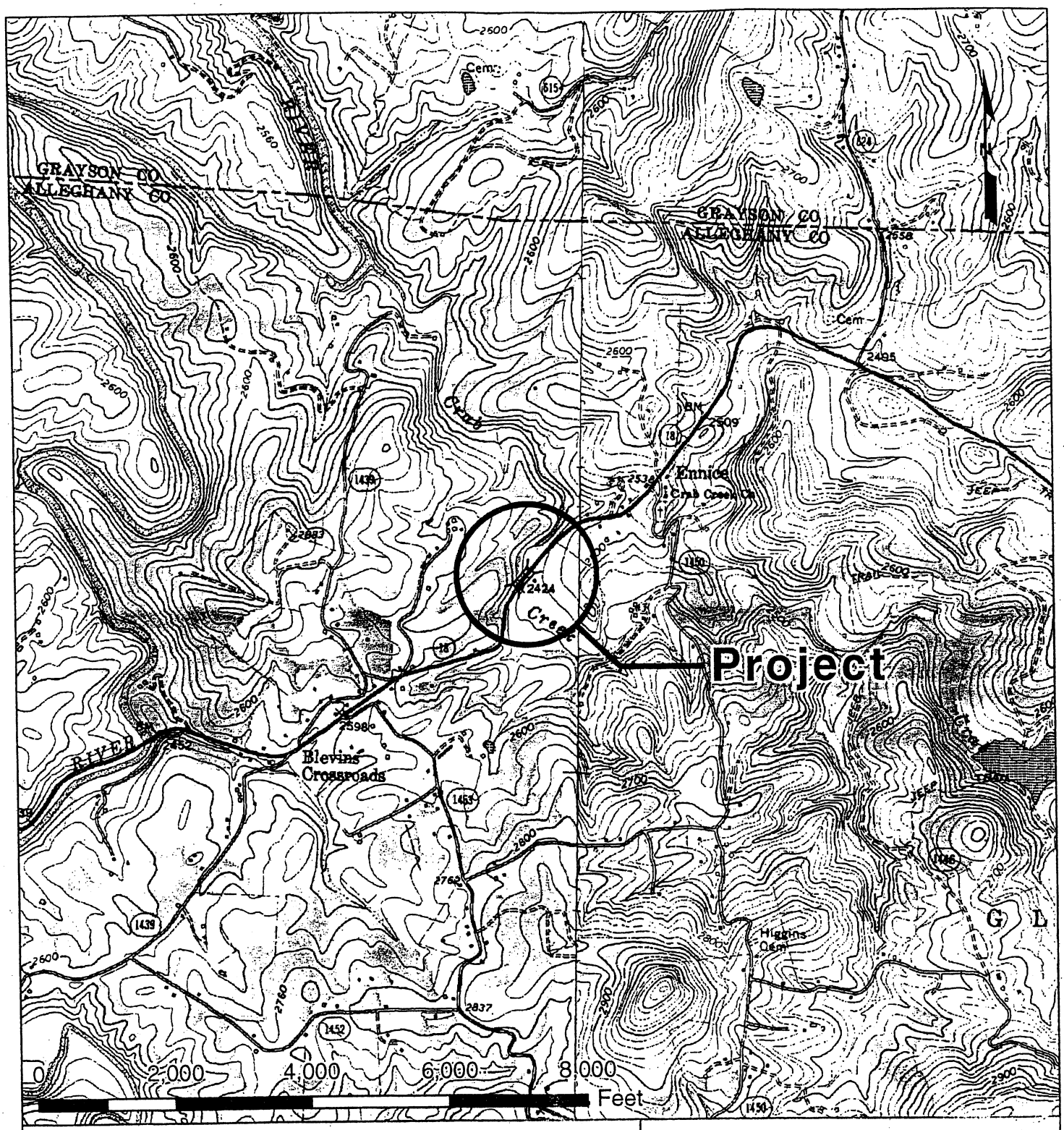


VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
ALLEGHANY COUNTY
PROJECT: 33375.1.1 (B-4007)
BRIDGE NO. 38 AND APPROACHES
OVER CRAB CREEK ON NC 18

SHEET 1 12/10/04



1 inch equals 2,000 feet

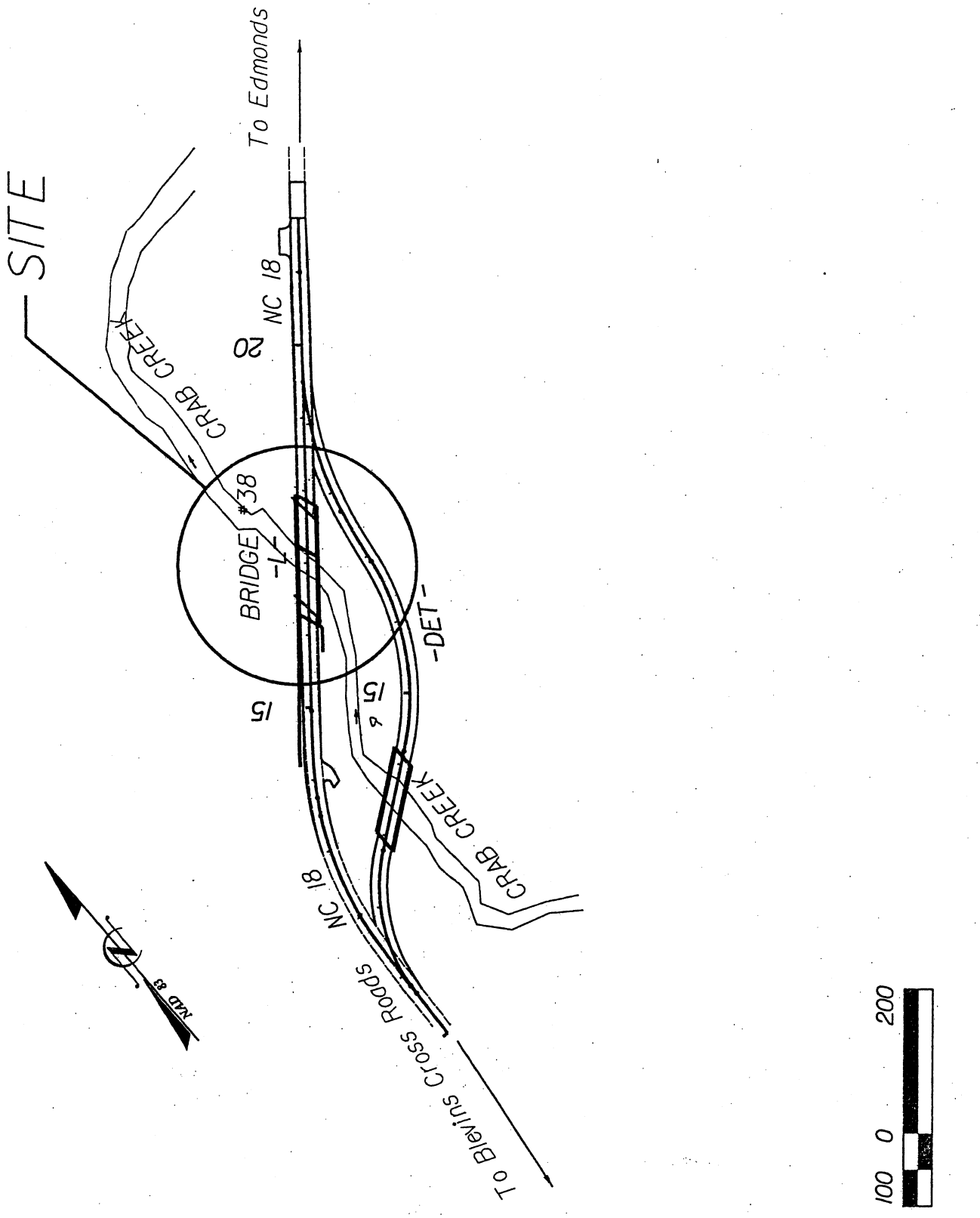
LOCATION

NCDOT

DIVISION OF HIGHWAYS
ALLEGHANY COUNTY
PROJECT: 33375.1.1 (B-4007)
BRIDGE NO. 38 AND APPROACHES
OVER CRAB CREEK ON NC 18

SHEET 2 12/10/04

Source: USGS 7.5 Minute Quadrangle, Sparta East and Cumberland Knob, NC



SITE MAP

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
ALLEGHANY COUNTY

PROJECT 33375.1.1 (B-4007)

BRIDGE NO. 38 AND APPROACHES
ON NC 18 OVER CRAB CREEK

SHEET 3 OF

12/13/04

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Alleghany County

Bridge No. 38 on NC 18

Over Crab Creek

Federal Aid Project No. BRSTP-18 (8)

State Project No. 8.1701201

T.I.P. No. B-4007

CATEGORICAL EXCLUSION
UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
AND
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

APPROVED:

12/30/03
DATE

for Gregory J. Thorpe, Ph.D., Environmental Management Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation

12/30/03
DATE

for John F. Sullivan, III
Division Administrator
Federal Highway Administration

Alleghany County

Bridge No. 38 on NC 18

Over Crab Creek

Federal Aid Project No. BRSTP-18 (8)

State Project No. 8.1701201

T.I.P. No. B-4007

CATEGORICAL EXCLUSION

December 2003

Document Prepared By:

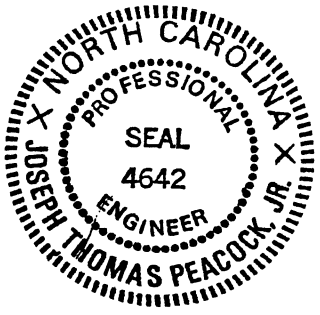
Rummel, Klepper & Kahl, LLP

Elizabeth S. Workman

Environmental Specialist

J. T. Peacock, Jr., P.E.

Associate



For the North Carolina Department of Transportation

Robert Andrew Joyner, P.E.

Project Manager

Consultant Engineering Unit

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PROJECT COMMITMENTS

Alleghany County
Bridge No. 38 on NC 18
Over Crab Creek
Federal Aid Project No. BRSTP-18 (8)
State Project No. 8.1701201
T.I.P. No. B-4007

DESIGN SERVICES UNIT, DIVISION 11

- North Carolina Wildlife Resources Commission (WRC) has prohibited any in-stream work and land disturbance activities, within 25 feet (7.6 meters) of Crab Creek, associated with this project during trout spawning season of October 15 through April 15.

Alleghany County
Bridge No. 38 on NC 18
Over Crab Creek
Federal Aid Project No. BRSTP-18 (8)
State Project No. 8.1701201
T.I.P. No. B-4007

INTRODUCTION: The replacement of Bridge No. 38 is included in the 2004-2010 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP) and in the Federal Aid Bridge Replacement Program. The location of this bridge is shown on Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion".

I. PURPOSE AND NEED STATEMENT

Bridge Maintenance Unit records indicate that Bridge No. 38 has a sufficiency rating of 47.6 out of a possible 100 for a new structure. This bridge is considered functionally obsolete and structurally deficient. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

The project is located in Alleghany County on NC 18, approximately 0.3 mile [0.5 kilometer (km)] west of the junction of SR 1450 (Green Road). The area surrounding the proposed project is mountainous and land use is best described as a mixture of residential areas, forest vegetation, agricultural fields and a maintained rights-of-way.

NC 18 is classified as a rural major collector route in the Statewide Functional Classification System.

In the vicinity of the bridge, NC 18 is a 20-foot [6-meter (m)] paved, 2-lane roadway. The roadway grade is relatively flat through the project area. The bridge crown to bed height is approximately 21 feet (6.4 m) above the riverbed at Bridge No. 38.

The current (2002) traffic volume of 1,700 vehicles per day (VPD) is expected to increase to 2,800 VPD by the year 2025. The project volume includes 2-percent truck-tractor semi-trailer (TTST)

and 3 percent dual-tired vehicles (DT). The posted speed limit in the project area is 55 miles per hour (mph) [90 kilometers/hour (km/h)].

There was one accident reported in the vicinity of Bridge No. 38 during the 3-year period beginning January 01, 1998 through December 31, 2000. These figures resulted in a total accident rate of 151 accidents per 100 million vehicle miles.

Bridge No. 38 is a 135-foot (41.1-m) long, triple span with a clear roadway width of 24 feet (7.3 m). The bridge has an asphalt-wearing surface on a reinforced concrete floor supported by four lines of 30-inch [76.2-centimeter (cm)] steel I-beams. End bents consist of reinforced concrete spill-through caps. The posted weight limit on this bridge is 28 tons for single vehicles and 31 tons for tractor trailer/semi-trucks (TTSTs). Bridge No. 38 was built in 1950 and is in poor condition. Photographs of the existing bridge are shown on Figures 2a and 2b.

There are no utilities attached directly to the existing structure. However, there are underground and aerial telephone services along NC 18 including a fiber optic cable. There is a single phase electrical line crossing NC 18 directly over the existing bridge. In a letter dated March 5, 2001, Alleghany County Manager stated, "Alleghany County doesn't have any water, sewer or natural gas lines running near the bridge" (See letter in Appendix). Overall, utility impacts are anticipated to be low and any specific impacts will be coordinated with appropriate utility personnel during construction.

One high school and two elementary school buses cross Bridge No. 38 twice a day for a total of six school bus crossings daily. In a letter dated February 15, 2001, the Alleghany County Board of Education indicated that the detour route is 3.5 miles (5.6 km) one way (See letter in Appendix).

Alleghany County Emergency Services prefers the alternatives that keep traffic on NC 18, either by use of the existing structure or an on-site detour rather than utilize off-site detours during the construction period.

III. ALTERNATIVES

A. Project Description

The replacement structure will consist of a three-span bridge that is approximately 145 feet (44.2 m) long and 30 feet (9.1 m) wide. The replacement structure will require standard spill-through abutments on each end. This structure provides two 12-foot (3.7-m) lanes with 3-foot (0.9-m) shoulders

on each side. The proposed approach roadway will consist of a 24-foot (7.4-m) pavement width to provide two 12-foot (3.7-m) lanes with 8-foot (2.4-m) shoulders on each side (See Figures 3a and 3b). The design speed for all alternatives is 60 mph (100 km/h). A design exception will be necessary for all alternatives due to vertical curves in the alignment. No bents will be located within Crab Creek.

The recommended bridge length is based on a preliminary hydraulic review. The final design of the bridge will be such that the proposed roadway and structure will be placed at approximately the same elevation. The bridge length will be maximized. The new structure will improve existing conditions, accommodate design flows, and minimize environmental impacts on any sensitive natural ecosystems that may be in the vicinity of the project study area.

B. Build Alternatives

The alternatives studied for replacing Bridge No. 38 are shown on Figure 4 and described below:

Alternative 1 – replaces the existing bridge with an approximately 145-foot (44.2-m) bridge on the existing alignment. An off-site detour will be used to maintain traffic during the construction. The approach work will extend from approximately 285 feet (86.9 m) south to approximately 220 feet (67.1 m) north of the existing bridge for a total distance of approximately 650 feet (198.1 m). The off-site detour, which is approximately 3.5 miles (5.6 km), uses SR 1450 (Green Road/Smith Acres Road), SR 1451 (Windy Hill/Crab Creek Road), and SR 1453 (Cooper Road) (See Figure 1). The detour route is described below:

- Heading northeast on NC 18, a right turn is made onto SR 1453 (Little Pine Road). This is a two-lane asphalt road and is followed for approximately 0.7 mile (1.1 km). This road is in good driving condition.
- A left turn is made onto SR 1451, a two-lane asphalt road. This state road is followed for approximately 0.7 mile (1.1 km) and is also in good driving condition.
- Finally, a left turn is made onto SR 1450. The first 0.75 mile (1.2 km) is a two-lane asphalt road. Just before it converts to an unpaved, one-lane road, the state route takes a sharp bend on a steep grade. Shortly after it becomes an unpaved road, a 90-degree sharp turn is made onto a single lane, low-lying bridge. The unpaved road continues as grade positively increases. It hits a sharp 180-degree bend on a very steep incline and shortly thereafter hits another 120-degree bend on a steep incline. Shoulders in this area are non-existent or deep due to roadway erosion. The road is unpaved for a total of approximately 0.375 mile (0.6

km) and then becomes a single-lane asphalt road for 0.05 mile (0.1 km) until it ties into NC 18.

Due to the hazardous driving conditions (steep grade, single-lane, twisting horizontal alignment, unpaved portions, and low-level bridge) of SR 1450, this alternative is not recommended due to the detour (See Figure 5 for photographs).

Alternative 2 – replaces the existing bridge with an approximately 145-foot (44.2-m) bridge on the existing alignment. An on-site detour will be used to maintain traffic during the construction period. The approach work will extend from approximately 285 feet (86.9 m) south to approximately 220 feet (67.1 m) north of the existing bridge for a total length of approximately 650 feet (198.1 m). The temporary on-site detour is located approximately 40 feet (12.2 m) west of the existing structure. Approach work for the temporary detour will extend from approximately 190 feet (58 m) south to approximately 190 feet (58 m) north of the approximately 130-foot (39.6-m) temporary structure for a total of approximately 510 feet (155.4 m). As an option to this alternative, a retaining wall can be used to lessen impacts. This retaining wall will be approximately 230 feet (70.1 m) in length with an average height of approximately 12 feet (3.7 m). This alternative requires cutting into a steep hillside on the southwest corner of the existing bridge, resulting in large amounts of waste excavation.

Alternative 3 – replaces the existing bridge with a 155-foot (47.2-m) structure located on a new location 40 feet (12.2 m) west of the existing bridge. The approach work will extend from approximately 490 feet (149.4 m) south to approximately 640 feet (387.0 m) north of the new structure for a total length of approximately 1,285 feet (391.7 m). Existing Bridge No. 38 will be used to maintain traffic during construction. A design exception will be necessary for this alternative due to the vertical curve in the alignment. As an option to this alternative, a retaining wall can be used to lessen impacts. This retaining wall will be approximately 420 feet (120.0 m) in length with an average height of approximately 15 feet (4.6 m). This alternative is not recommended since it requires a massive cut into the hillside at the southwest corner of the bridge, resulting in large amounts of waste excavation.

Alternative 4 (Preferred) - replaces the existing bridge with an approximately 145-foot (44.2-m) bridge on the existing alignment. The approach work will extend from approximately 285 feet (86.9 m) south to approximately 220 feet (67.1 m) north of the existing bridge for a total length of

approximately 650 feet (198.1 m). A temporary bridge, approximately 125 feet (38.1 m) in length and 28 feet (8.5 m) in width, is located 340 feet (103.6 m) south of the existing bridge and will be used to maintain traffic during the construction period. The detour approach work will extend from approximately 215 feet (65.5 m) south of the temporary bridge to approximately 550 feet (167.6 m) north of the temporary bridge for a total length of approximately 890 feet (271.2 m). The temporary detour design speed is 28 mph (44.8 km/h).

C. Alternatives Eliminated from Further Study

The No-Build or "Do Nothing" alternative will eventually necessitate closure of the bridge. This is not acceptable due to the traffic service provided by NC 18.

A box culvert was considered but is not a feasible alternative for this location.

"Rehabilitation" of the existing structure is not feasible due to its age and deteriorated condition.

D. Preferred Alternative

Alternative 4, replacing the existing bridge on its existing alignment with an on-site detour, is the preferred alternative. It was selected because it maintains traffic flow, avoids cutting into the mountain west of the existing bridge, and costs less than Alternatives 2 (without retaining wall) and 3 (with and without retaining walls).

IV. ESTIMATED COSTS

The estimated costs, based on current prices (2003), are presented in Table 1.0.

Table 1.0 Estimated Costs per Alternative

	Alternative 1	Alternative 2		Alternative 3		Alternative 4 (Preferred)
		Without retaining wall	With retaining wall	Without retaining wall	With retaining wall	
Structure	$528,750	$528,750	$528,750	$528,750	$528,750	$528,750
Roadway Approaches	$97,725	$384,495	$283,195	$1,174,850	$662,250	$216,315
Structure Removal	$32,750	$32,750	$32,750	$32,750	$32,750	$32,750
Misc. and Mobilization	$125,051	$288,945	$199,260	$605,708	$265,238	$273,362
Temporary On-Site Detour	$0	$156,910	$156,910	$0	$0	$290,460
Engineering & Contingencies	$140,724	$258,150	$199,135	$357,942	$261,012	$208,363
TOTAL CONSTRUCTION COST	$925,000	$1,650,000	$1,400,000	$2,700,000	$1,750,000	$1,550,000
Right of Way / Utilities	$43,000	$59,500	$58,000	$48,500	$45,000	$55,500
TOTAL PROJECT COST	$968,000	$1,709,500	$1,458,000	$2,748,500	$1,795,000	$1,605,500

The estimated cost of the project, shown in the 2004-2010 NCDOT's TIP is $ 850,000, including $ 50,000 for right-of-way and $ 800,000 for construction.

V. NATURAL RESOURCES

The information contained in this section is based on the Natural Systems Report (March 2002) prepared by Environmental Services Inc.

A. Methodology

The project study area was visited, walked, and visually surveyed for significant features on May 1, 2001. The project study area encompasses 17.01 acres [6.88 hectares (ha)] around the various alternatives under consideration and is approximately 2,200 feet (670.6 m) in length and 400 feet

(121.9 m) in width. Impacts calculated for each alignment using a width of approximately 60 feet (18.3 m); actual impacts will occur within construction limits and will be less than those calculated for this report. Special concerns evaluated in the field include potential habitat for protected species, streams, wetlands, and water quality protection.

Materials and research data in support of this investigation have been derived from a number of sources including applicable U.S. Geological Survey (USGS) 7.5-minute topographical quadrangle mapping (Sparta East, VA 1983), U.S. Fish and Wildlife Service (FWS) National Wetlands Inventory (NWI) mapping, United States Department of Agriculture (USDA) - Natural Resources Conservation Service (NRCS) Alleghany County Soil Survey (USDA 1972), and recent aerial photography (scale 1:1200) furnished by NCDOT.

Plant community descriptions are based on a classification system utilized by the North Carolina Natural Heritage Program (NHP) (Schafale and Weakley 1990). When appropriate, community classifications were modified to better reflect field observations. Vascular plant names follow nomenclature found in Radford *et al.* (1968). Jurisdictional areas were identified using the three parameter approach (hydrophytic vegetation, hydric soils, wetland hydrology) following U.S. Army Corps of Engineers (COE) delineation guidelines [Department of Army (DOA) 1987]. Jurisdictional areas were characterized according to a classification scheme established by Cowardin *et al.* (1979). Habitat used by terrestrial wildlife and aquatic organisms, as well as expected population distributions, were determined through field observations, evaluation of available habitat, and supportive documentation (Martof *et al.* 1980, Webster *et al.* 1985, Menhinick 1991, Hamel 1992, Rohde *et al.* 1994, Palmer and Braswell 1995). Water quality information for area streams and tributaries was derived from available sources [Department of Environmental Management (DEM) 1989 and 1993, and Department of Environment and Natural Resources (DENR) 2000 and 2001a]. Quantitative sampling was not undertaken to support existing data.

The most current FWS listing of federally protected species with ranges which extend into Alleghany County was obtained prior to initiation of the field investigation (list date February 26, 2001, updated through January 29, 2003). In addition, NHP records documenting presence of federal or state listed species were consulted before commencing the field investigation and were periodically updated (most recent review date October 10, 2001).

B. Physiography and Soils

The project study area is located in the Mountain geological province. Topography is characterized as rolling to steep mountainous terrain. Elevations in the project study area range from approximately 2,400 feet (731.5 m) above mean sea level (MSL) to approximately 2,570 feet (783.3 m) above MSL (USGS Sparta East, NC-VA quadrangle).

The project study area crosses five soil-mapping units (USDA 1973). The four non-hydric soils are mapped as Chester loam (10 to 25% slopes) (Typic Hapludult), Ashe stony fine sandy loam (45 to 64% slopes) (Typic Dystrochrept), Comus fine sandy loam (Fluventic Dystrochrept), and Tate loam (10 to 15% slopes) (Typic Hapludult). Also, included in the project study area is a hydric soil-mapping unit designated Alluvial land, which is associated with wet areas (USDA 1973).

C. Water Resources

1. Waters Impacted

The project study area is located within the sub-basin 050703 of the New River Basin (DENR 2000) and is part of USGS hydrologic unit 05050001 (USGS 1974). Crab Creek originates south of NC 18 near SR 1444 (Glade Valley Road) in Alleghany County and flows north to its confluence with the Little River northwest of the project study area. Crab Creek has been assigned Stream Index Number (SIN) 10-9-12 by the Division of Water Quality (DWQ) (DEM 1993, DENR 2001a) from its source to the Little River.

2. Water Resource Characteristics

Stream Characteristics

Crab Creek is a perennial stream with moderate flow over substrate consisting of sand, gravel, and cobble with occasional boulders. This channel ranges from 12 to 30 feet (2.7 to 9.1 m) in width with a bankfull depth of approximately 24 to 30 inches (60.9 to 76.2 cm). A geomorphic characterization of the stream section within the project study area indicates Crab Creek is a "B" channel (Rosgen 1996). This section has moderate sinuosity, little available floodplain, and well-developed riffle/plunge pool sequences with a high width/depth ratio.

Best Usage Classifications and Water Quality

Classifications are assigned to waters of the State of North Carolina based on the existing or contemplated best usage of various streams or segments of streams in the basin. Crab Creek has a best usage classification of **C Tr** (DEM 1993, DENR 2001a). The designation **C** indicates waters that support

aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation refers to human body contact with waters on an infrequent or incidental basis. The supplemental classification **Tr** is used for trout waters characterized as waters suitable for natural trout propagation and maintenance of stocked trout.

No Outstanding Resource Waters (**ORW**), **WS-I**, or **WS-II** Waters occur within 3.0 miles (4.8 km) of the project study area. High Quality Waters (**HQW**) occur in the Little River (SIN 10-9-11.5) approximately 1.0 mile (0.4 km) downstream of the project study area. The **HQW** designation indicates waters that are rated as excellent based on biological and physical/chemical characteristics (DEM 1993, DENR 2001a). Crab Creek is not designated as a North Carolina Natural and Scenic River, nor as a National Wild and Scenic River.

Crab Creek is a Designated Public Mountain Trout Water (DPMTW) and is stocked by the WRC. Also, Crab Creek is classified as a Trout Water by DWQ.

There are no National Pollutant Discharge Elimination Systems (NPDES) or significant non-point source dischargers within 1 mile (1.6 km) of the project study area [Division of Planning and Assessment (DPA) 1991, DENR 2001b].

From 1986 to 1998, five benthic macroinvertebrate samples were taken 1.0 mile (1.6 km) southwest from the project study area at NC 18 over the Little River. On each occasion, the Little River received a bioclassification of Excellent (DENR 2000). No benthic macroinvertebrate samples were taken from Crab Creek from 1986 to 1998.

Another measure of water quality being used by DWQ is the North Carolina Index of Biotic Integrity (NCIBI), which assesses biological integrity using the structure and health of the fish community. An NCIBI sample was taken in 1998, approximately 9.0 miles (14.5 km) downstream from the project study area at SR 1428 (Collins Road) over the Little River, and received a rating of good (DENR 2000). No NCIBI samples were collected in Crab Creek in 1998.

3. Anticipated Impacts to Water Resources

After construction activities are completed, abandoned approaches associated with the existing structure and/or temporary detours will be removed and revegetated in accordance with NCDOT guidelines. However, anticipated impacts to open water areas and linear feet of stream are shown in Table 3.0

Short-term impacts to water quality, such as sedimentation and turbidity, can be anticipated from construction-related activities. Best Management Practices (BMPs) such as including implementation of stringent erosion and sedimentation control measures and avoidance of using wetlands as staging areas can minimize construction impacts. Additional measures which can be taken to minimize water quality impacts include avoiding the placement of live concrete directly into the stream channel and keeping heavy equipment operations from being conducted in the stream channel.

Other impacts to water quality that are anticipated as a result of this project include: changes in water temperature as a result of canopy removal and increased exposure to sunlight, increased shade due to the construction of a new detour bridge, and changes in stormwater flows if detour construction changes in the amount of impervious surface adjacent to the stream channels.

In-stream construction activities will be scheduled to avoid and minimize impacts to aquatic resources/organisms. Alleghany County is among the twenty-five mountain counties designated as having trout waters. Crab Creek is designated as a Hatchery Supported Water. In a letter dated August 6, 2001, the WRC stated that it would require a trout moratorium from October 15 through April 15. There is a 25-foot (7.62 m) buffer requirement adjacent to the creek.

No adverse indirect or cumulative impacts to water resources are expected to result from any of the alternatives being considered. New location alternatives and alternatives requiring on-site detours will result in limited clearing of some canopy along the stream bank, resulting in potential for localized increase in sunlight and stream temperature. All alternatives for the proposed project include a channel spanning structure, which will allow for continuation of present stream flow within the existing channel, thereby protecting stream integrity. No bents will be placed within the creek.

4. Impacts Related to Bridge Demolition and Removal

Section 402-2 of NCDOT's Standard Specifications for Roads and Structures is labeled **Removal of Existing Structure**. This section outlines restrictions and Best Management Practices for Bridge Demolition and Removal (BMPs-BDR), as well as guidelines for calculating maximum potential fill in the creek resulting from demolition. Heavy equipment must be operated from the banks rather than in the stream channel in order to minimize sediment and reduce the likelihood of introducing other pollutants into the stream (See the DWQ letter dated August 15, 2001 in Appendix).

The superstructure consists of concrete deck, curbing and girders. Although these components are slated for a removal in a manner which will avoid dropping any component into Crab Creek, the potential exists for temporary fill of up to 17 cubic yards (13.0 cubic meters). The substructure consists of two concrete interior bents located within the stream channel. Although these components are slated for removal in a manner which will avoid dropping any component into Crab Creek, the potential exists for temporary fill of up to 55 cubic yards (42.1 cubic meters). Due to the presence of concrete in the superstructure and substructure of the bridge, the potential exists for up to approximately 72 cubic yards (55.1 cubic meters) of temporary fill being excavated from Crab Creek as a result of demolition activities.

Crab Creek is a DPMTW; therefore, Case 2 stream crossings do not allow any work at all in the water during the moratorium periods associated with fish migration, spawning, and larval recruitment into nursery areas.

D. Biotic Resources

1. Plant Communities

Five distinct plant communities, identified within the project study area, follow the Schafale and Weakley classification system. They are as follows: Maintained/Disturbed Areas, Pasture Land, Piedmont/Low Mountain Alluvial Forest, Cove Forest, and White Pine Forest. These communities total approximately 14.67 acres (5.94 ha), which does not include the approximately 1.69 acres (0.68 ha) of impervious surface or 0.65 acre (0.26 ha) of open water within the project study area. See Table 7.0 for plant community impacts per alternative. These plant communities are described below:

a. Man-Dominated Communities

Maintained/Disturbed Areas – The Maintained/Disturbed Areas cover approximately 6.48 acres (2.62 ha) (38.1 percent) of the project study area and include roadsides, maintained residential yards, powerline right-of-way corridors, and areas where other human related activities dominate. Roadside and

powerline rights-of-way are maintained by mowing and/or herbicides. Residential yards are dominated by various grasses, shrubs and ornamentals and are mowed regularly. The project study area includes disturbed areas such as roadsides, residential yards, Christmas tree farms, and open areas which are regularly mowed, but are not under agricultural production.

Pasture Land – Pasture Land covers approximately 2.25 acres (0.91 ha) (13.2 percent) of the project study area. This community includes grassy areas used for grazing animals or hay production. These areas are not used for production of agricultural crops.

b. Other

Piedmont/Low Mountain Alluvial Forest – The Piedmont/Low Mountain Alluvial Forest covers approximately 2.25 acres (0.91 ha) (13.2 percent) of the project study area and is associated with the Crab Creek floodplain. The Piedmont/Low Mountain Alluvial Forest community is located in river and stream floodplains in which separate fluvial landforms and associated vegetation zones are too small to distinguish (Schafale and Weakley 1990). In the project study area, the vegetation has been altered to demonstrate a younger successional state. The area consists primarily of rosebay (*Rhododendron maximum*), ironwood (*Carpinus caroliniana*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), soft rush (*Juncus effuses*), tag alder (*Alnus serrulata*), and mayapple (*Podophyllum peltatum*). This community includes two jurisdictional wetland areas, which are discussed in Section V.D.4.b.

Cove Forest – The Cove Forest covers approximately 1.24 acres (0.50 ha) (7.3 percent) of the project study area and is characterized as having a pre-dominance of mesophytic trees and diverse herb layer. It is generally located in low to moderate elevation sites and primarily broad coves and lower slopes. The Cove Forest in the project study area is located at the base of the north-facing slopes. The species present in this community type include tulip poplar (*Liriodendron tulipifera*), black cherry, Christmas fern (*Polystichum acrostichoides*), bedstraw (*Galium* sp.), and mayapple.

White Pine Forest – This north-facing forest is a pure stand of white pine (*Pinus strobus*) with an open understory which covers approximately 2.45 acres (0.99 ha) (14.4 percent) of the project study area. The understory consists of widely scattered black cherry and red maple saplings. No herbaceous vegetation was noted.

2. Wildlife

The project study area was visually surveyed for signs of terrestrial and aquatic wildlife. Little evidence of wildlife was observed during the field effort. The project study area includes a busy roadway, residential yards, mature forest cover and agricultural and pasture lands. Alluvial forests along streams such as Crab Creek provide cover and food and allow animals to travel between more optimal habitats. Other expected wildlife species are those adapted to the ecotones between the maintained roadsides and adjacent natural forest.

Several bird species were observed within or adjacent to the project study area. Bird species observed include the turkey vulture (*Cathartes aura*), barn swallow (*Hirundo rustica*), American crow (*Corvus brachyrhynchos*), tufted titmouse (*Baeolophus bicolor*), Carolina wren (*Thryothorus ludovicianus*), wood thrush (*Hylocichla mustelina*), American robin (*Turdus migratorius*), northern cardinal (*Cardinalis cardinalis*), indigo bunting (*Passerina cyanea*), and eastern towee (*Pipilo erythrophthalmus*).

Mammals and mammal signs (tracks, scat, *etc.*) observed within the project study area included domestic dog (*Canis familiaris*), Virginia opossum (*Didelphis virginiana*), and gray squirrel (*Sciurus carolinensis*). Evidence of white-tail deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), and beaver (*Castor canadensis*) was noted. Species expected to use the Crab Creek floodplain as a travel corridor include red fox (*Vulpes vulpes*), eastern cottontail (*Sylvilagus floridanus*), and bobcat (*Felis rufus*).

The only terrestrial reptile observed within the project study area was the copperhead (*Agkistrodon contortrix*). Expected reptile species include eastern garter snake (*Thamnophis sirtalis*), ringneck snake (*Diadophis punctatus*), black rat snake (*Elaphe obsoleta*), and eastern box turtle (*Terrapene carolina*).

No terrestrial amphibians were observed within the project study area. Species expected to occur within the project study area include slimy salamander (*Plethodon* spp.), Fowler's toad (*Bufo woodhouseii*), spring peeper (*Pseudacris crucifer*), and northern cricket frog (*Acris crepitans*).

3. Aquatic Communities

Limited kick-netting, seining, dip-netting, and visual observation of stream banks and channel within the project study area were conducted in Crab Creek. Fish species documented in the segment of Crab Creek within the project study area are white sucker (*Catostomus commersoni*), northern hogsucker (*Hypentelium nigricans*), Kanawha darter (*Etheostoma kanawhae*), fantail darter (*Etheostoma flabellare*), greenside darter (*Etheostoma blennioides*), mountain red belly dace (*Phoxinus oreas*), central stoneroller (*Campostoma anomalum*), redlip shiner (*Notropis chiliticus*), bluehead chub (*Nocomis leptocephalus*), and saffron shiner (*Notropis rubricroceus*). Identifications were based on Rohde *et al.* (1994), Menhinick (1991), and Page (1991).

Aquatic invertebrate surveys consisted of kick-net surveys, sweep-net surveys, leaf pack sampling, limited bottom sampling, and walking all streambanks in the project study area to locate freshwater mussel middens. Visual observation revealed evidence of freshwater mussels (Unionoidae). Kick-net surveys, sweep-net surveys, leaf pack sampling, visual observations of semi-permanent rocks and debris within Crab Creek and limited bottom sampling conducted within the channel of Crab Creek produced various aquatic macroinvertebrates. Organisms collected were identified to Order and include mayflies (Ephemeroptera), stoneflies (Plecoptera), caddisflies (Trichoptera), dragonflies (Odonata), crane flies and midges (Diptera), water beetles (Coleoptera), hellgrammites (Megaloptera), snails (Class Gastropoda), aquatic earthworms (Class Oligochaeta), water bugs (Hemiptera), and crayfish (Decapoda). Identifications are based on Merritt *et al.* (1996) and McCafferty (1998).

No aquatic reptiles were observed within the project study area. Species expected to occur within project study area include the northern water snake (*Nerodia sipedon*), queen snake (*Regina septemvittata*), painted turtle (*Chrysemys picta*), and common snapping turtle (*Chelydra serpentina*).

Few aquatic amphibians were observed within the project study area. The aquatic species found include four unidentified larval salamanders, tadpoles and a hellbender (*Cryptobranchus alleganiensis*). The hellbender is a Federal species of concern (FSC) and is discussed further in Section V.F.2. Species expected to occur within the project study area include red-spotted newt (*Notophthalmus viridescens*), bullfrog (*Rana catesbeiana*), and pickerel frog (*Rana palustris*).

4. Anticipated Impacts to Biotic Communities

a. Terrestrial Communities

Due to the limited extent of infringement on natural communities, the proposed bridge replacement will not result in significant loss or displacement of known terrestrial animal populations. Wildlife movement corridors are currently limited within the project study area and are not expected to be significantly impacted by the proposed project.

Anticipated impacts to plant communities are estimated based on the acreage of each plant community present within the proposed right-of-way of 60 feet (18.3 m); actual impacts within construction limits will be less. A summary of potential plant community impacts is presented in Table 2.0.

Table 2.0 Plant Community Impacts per Alternative

PLANT COMMUNITY	ESTIMATED IMPACTS In Acres (Hectares)					
	Alternative 1	Alternative 2		Alternative 3	Alternative 4 (Preferred)	
	Impacts	Impacts	Temp. Detour Impacts	Impacts	Impacts	Temp. Detour Impacts
Piedmont/Low Mountain Alluvial Forest	0.00	0.00	0.09 (0.04)	0.05 (0.02)	0.00	0.31 (0.13)
Cove Forest	0.00	0.00	0.00	0.26 (0.11)	0.00	0.00
Maintained/Disturbed	0.38 (0.15)	0.38 (0.15)	0.19 (0.08)	1.37 (0.55)	0.38 (0.15)	0.28 (0.11)
White Pine Forest	0.00	0.00	0.09 (0.04)	0.22 (0.09)	0.00	0.00
Pasture Land	0.00	0.00	0.00	0.00	0.00	0.38 (0.15)
Total:	0.38 (0.15)	0.38 (0.15)	0.37 (0.15)	1.90 (0.77)	0.38 (0.15)	0.97 (0.39)
Total for Alts:	0.38 (0.15)	0.75 (0.30)		1.90 (0.77)	1.35 (0.55)	

Note: Temporary construction impacts are based on the portion of the impacts not included in the construction limits for the permanent structure.

Alternative 1 contains the least amount of potential impacts (0.38 acre) (0.15 ha) with all potential impacts occurring within the Maintained/Disturbed Areas. Alternative 2 contains the same potential permanent impacts as Alternative 1 (0.38 acre) (0.15 ha), but also includes additional potential impacts associated with its temporary detour (0.37 acre) (0.15 ha). The majority of temporary detour

impacts associated with Alternative 2 are contained within Maintained/Disturbed Areas, but also include potential impacts to Piedmont/Low Mountain Alluvial Forest and White Pine Forest. Alternative 3 contains the largest amount of potential permanent impacts (1.90 acres) (0.77 ha). Alternative 3 is the longest alternative being considered. The majority of potential permanent impact occurs within Maintained/Disturbed Areas, but Alternative 3 also contains the largest potential permanent impacts to these plant communities (0.53 acre) (0.21 ha). Alternative 4 contains the same potential permanent impacts as Alternative 1 (0.38 acre) (0.15 ha), but also includes additional potential impacts associated with its temporary detour (0.97 acre) (0.39 ha). The majority of temporary detour impacts associated with Alternative 4 are contained within Pasture Land Areas, but also include potential impacts to Piedmont/Low Mountain Alluvial Forest and Maintained and Disturbed Areas.

b. Wetland Communities

Anticipated impacts to wetlands and open water areas are estimated based on the amount of each jurisdictional area within the proposed right-of-way width of 60 feet (18.3 m); actual areas within construction limits will be less. Possible impacts to the open water areas of Crab Creek and the palustrine scrub-shrub wetland (PSS) described by Cowardin et al. (1979) are included in this table. A summary of potential jurisdictional impacts is presented in Table 3.0.

Table 3.0 Estimated Impacts to Jurisdictional Areas

JURISDICTIONAL AREAS	ESTIMATED IMPACTS					
	Alternative 1	Alternative 2		Alternative 3	Alternative 4 (Preferred)	
	Impacts	Impacts	Temp. Detour Impacts	Impacts	Impacts	Temp. Detour Impacts
Crab Creek in acres (hectares)	0.06 (0.02)	0.06 (0.02)	0.05 (0.02)	0.06 (0.02)	0.06 (0.02)	0.05 (0.02)
PSS in acres (hectares)	0.00	0.00	0.00	0.00	0.00	0.03 (0.01)
Total	0.06 (0.02)	0.06 (0.02)	0.05 (0.02)	0.06 (0.02)	0.06 (0.02)	0.08 (0.03)
TOTAL FOR ALTS:	0.06 (0.02)	0.11 (0.04)		0.06 (0.02)	0.14 (0.05)	
Stream Channel Impacts in linear feet (meters)	60 (18.3)	60 (18.3)	60 (18.3)	60 (18.3)	60 (18.3)	60 (18.3)
TOTAL FOR ALTS:	60 (18.3)	120 (36.6)		60 (18.3)	120 (36.6)	

Note: Temporary construction impacts are based on the portion of the impacts not included in the construction limits for the permanent structure.

Alternatives 1 and 3 each contain the least amount of potential impacts to jurisdictional areas, at approximately 0.06 acre (0.02 ha), and the least amount of potential impact to the stream channel, at approximately 60 linear feet (18.3 m). Alternative 2 contains a medium amount of potential impacts to jurisdictional areas, at approximately 0.11 acre (0.04 ha). Alternative 4 contains the most amounts of potential impacts to jurisdictional areas, at approximately 0.14 acre (0.05 ha). Both Alternatives 2 and 4 have the most amount of potential impact to the stream channel, at approximately 120 linear feet (36.6 m). Alternatives 2 and 4 contain the same amount of potential permanent impacts as Alternatives 1 and 3, but includes potential impacts associated with the temporary detour.

Wetlands subject to review under Section 404 of the Clean Water Act (33 USC 1344) are defined by the presence of three primary criteria: hydric soils, hydrophytic vegetation, and evidence of wetland hydrology at or near the surface for a portion of the growing season (DOA 1987). Based on the three-parameter approach, two jurisdictional wetlands are present within the project study area (See Figure 6).

The first wetland (W1) is less than 0.01 acre (<0.01 ha) in areal extent and exhibited characteristics of palustrine, shrub-scrub assemblage (PSS). Soils exhibited hydric characteristics (Munsell color 10YR3/1). Vegetation was hydrophytic in nature, consisting of red maple seedlings and soft rush. Evidence of jurisdictional hydrology was noted, with saturation noted at the soil surface, and free water within 1 inch (2.5 cm) of the soil surface.

The second wetland (W2) is approximately 0.03 acre (0.01 ha) in areal extent and exhibited characteristics of palustrine, scrub-shrub assemblage (PSS). Soils exhibited hydric characteristics (Munsell color 10YR3/1, 10YR4/2 with 10YR6/6 mottles). Vegetation was hydrophytic in nature, consisting of tag alder and soft rush. Evidence of jurisdictional hydrology was noted, with saturation noted at the soil surface, and free water within 1 inch (2.5 cm) of the soil surface.

c. Aquatic Communities

Potential down-stream impacts to aquatic habitat will be minimized by bridging Crab Creek to maintain regular flow and stream integrity. In addition, temporary impacts to downstream habitat from increased sediment during construction are expected to be reduced by limiting the in-stream work to an absolute minimum, except for the removal of the portion of the substructure below the water. BMPs-BDR will be followed to minimize impacts due to anticipated bridge demolition. Best Management Practices for the protection of surface waters should be strictly enforced to reduce impacts.

E. Special Topics

1. "Waters of the United States": Jurisdictional Issues

Surface waters within the embankments of Crab Creek and wetlands are subject to jurisdictional consideration under Section 404 of the Clean Water Act as "Waters of the United States" [33 Code of Federal Register (CFR) 328.3]. The waters in Crab Creek within the project study area exhibit characteristics of riverine, upper perennial, unconsolidated bottom, permanently flooded waters (R3UBH) (Cowardin *et al.* 1979).

2. Permits

a. Section 404 of the Clean Water Act

This project is being processed as a Categorical Exclusion (CE) under Federal Highway Administration (FHWA) guidelines. Nationwide Permit (NWP) #23 [33 CFR 330.5(a)(23)] has been issued by the COE for CEs due to expected minimal impact. In the event that NWP #23 will not suffice, minor impacts attributed to bridging and associated approach improvements are expected to qualify under General Bridge Permit 031 issued by the Wilmington COE District. Notification to the Wilmington COE office is required if this general permit is utilized. NWP #33 may be used if temporary structures, work, and discharges, including cofferdams are necessary for this project.

b. Section 401 Water Quality Certification

Section 401 of the Clean Water Act delegates authority to the states to issue a 401 Water Quality Certification for all projects that require a Federal Permit, such as a Section 404 Permit. DWQ has issued a General 401 Water Quality Certification for NWP #23. However, use of this permit will require written notice to DWQ.

c. Bridge Demolition and Removal

Section 402-2 of NCDOT's Standard Specifications for Roads and Structures is labeled **Removal of Existing Structure**. This section outlines restrictions and BMPs-BDR, as well as guidelines for calculating maximum potential fill in the creek resulting from demolition. After construction activities are completed, abandoned approaches associated with the existing structure and/or temporary detours will be removed and revegetated in accordance with NCDOT guidelines. "Case 2" applies to this project due to Crab Creek being designated a trout water. Case 2 allows no work in the water at all during the moratorium period of October 15 through April 15. A 25-foot (7.62 m) buffer is required for trout waters.

d. Coast Guard

Bridge replacement or construction over navigable waters used for commerce or that have a maintained navigation channel may require United States Coast Guard (USCG) authorization pursuant to 33 CFR 114-115. Crab Creek is not classified as a navigable water; therefore, USCG authorization is not required.

e. Tennessee Valley Authority

Bridge No. 38 is located outside of the Tennessee River drainage area and no TVA land or land rights are involved. Therefore, TVA's approval of the plans pursuant to Section 26a of the TVA Act for Bridges and Indicated Locations is not required.

f. Designated Public Mountain Trout Water

Alleghany County is among the twenty-five mountain counties designated as having trout waters. Crab Creek is a DPMTW and is hatchery supported. The COE has implemented discretionary authority to override certain nationwide and general permits which authorize the discharge of dredged or fill materials into DPMTWs. Generally, projects involving trout stream infringement, including all waters upstream to and above their headwaters, can be processed under either General Bridge Permit 031, NWP #23, or Individual Permit. Projects in trout waters require final review by WRC before construction. In a letter dated August 6, 2001, the WRC stated it would require a trout moratorium from October 15 through April 15. This moratorium would be required because Crab Creek is designated as a Hatchery Supported Water.

g. Special Waters

No Outstanding Resource Waters (**ORW**), **WS-I**, or **WS-II** Waters occur within 3.0 miles (4.8 km) of the project study area. High Quality Waters (**HQW**) occur in the Little River (SIN 10-9-11.5) approximately 1.0 mile (0.4 km) downstream of the project study area. The **HQW** designation indicates waters that are rated as excellent based on biological and physical/chemical characteristics (DEM 1993, DENR 2001a). Crab Creek is not designated as a National Wild and Scenic River, nor as a North Carolina Natural and Scenic River.

3. Buffer Rules

No buffer rules currently apply to the New River Basin. However, due to Crab Creek's status of DPMTW, a 25-foot (7.62 m) buffer is required for this project. Erosion control measures in this buffer zone should not employ tall fescue.

4. Mitigation

Avoidance – Due to the presence of surface waters within the project study area, avoidance of impacts is not possible. The proposed alternatives avoid impacts to most jurisdictional wetland areas. Wetland and stream impacts for each alternative are previously discussed in Section V.D.4.b.

Minimization – The alternative corridors presented were developed in part to demonstrate minimization of stream impacts. Impacts to the stream will be minimized during demolition by removing bridge components in a manner which will avoid dropping any component into the creek channel. In-stream construction activities will be scheduled to avoid and minimize impacts to aquatic resources.

Mitigation - Compensatory mitigation probably will not be required for this project due to the limited nature of project impacts. However, utilization of BMPs is recommended in an effort to minimize impacts include not placing staging areas within wetlands. Temporary impacts associated with the construction activities could be mitigated by replanting disturbed areas with native species and removal of temporary fill material within the floodplain upon project completion.

Compensatory mitigation is conventionally required for projects authorized under Individual Permits or certain Nationwide Permits that result in the fill or alteration of more than 0.10 acre (0.40 ha) of wetlands and/or 150 feet (45.70 m) of streams. Under the nationwide permit program, the District Engineer must be notified if proposed discharge to wetlands will exceed 0.10 acre (0.40 ha). Discharges to wetlands exceeding 0.10 acre (0.40 ha), for which authorization under a Nationwide Permit #14 is being sought, require submittal of a compensatory mitigation plan as part of the notification.

F. Rare and Protected Species

1. Federally Endangered and Threatened Species

Species with the federal classification of Endangered (E) or Threatened (T), or officially proposed (P) for such listing, are protected under Sections 7 and 9 of the Endangered Species Act (ESA) of 1973, as amended (16 USC 1531 *et seq.*). One federally protected species, the bog turtle (*Clemmys muhlenbergii*), is listed for Alleghany County (January 29, 2003 FWS list):

Bog Turtle - The bog turtle is a small turtle reaching an adult size of approximately 3 to 4 inches (7.6 to 10.2 cm). This otherwise darkly-colored species is readily identifiable by the presence of a bright orange or yellow blotch on the sides of the head and neck (Martof *et. al.* 1980). The bog turtle is typically found in bogs, marshes, and wet pastures, usually in association with aquatic or semi-aquatic vegetation and small, shallow streams over soft bottoms (Palmer and Braswell 1995). In North Carolina, bog turtles have a discontinuous distribution in the Mountains and western Piedmont. NHP records indicate two occurrences of the bog turtle located 3.0 miles (4.8 km) east of the project study area. The first occurred in 1973 and the second occurred in 1991.

> **BIOLOGICAL CONCLUSION:** The bog turtle is listed as Threatened due to Similarity of Appearance [T(S/A)]. Although potential habitat for this species exists within the project study area, T(S/A) species are not subject to Section 7 consultation and a biological conclusion is not required. However, this project is not expected to affect the bog turtle due to lack of suitable habitat within the project study area, with wooded wetlands rather than open and herbaceous dominated wetlands, and the channel present within the project study area is coarse-bottomed rather than soft-bottomed. **NO EFFECT**

2. Federal Species of Concern

The January 29, 2003 FWS list also includes a category of species designated as "Federal species of concern" (FSC). The FSC designation provides no federal protection under the ESA for the species listed. The NHP database was searched on September 1, 2003 for FSC occurrences in Alleghany County. The presence of potential suitable habitat (Amoroso 1999, LeGrand and Hall 1999) within the project study area has been evaluated for the following FSC species.

Table 4.0 Federal Species of Concern for Alleghany County			
Common Name	Scientific Name	State Status*	Potential Habitat
Hellbender	*Cryptobranchus alleganiensis*	SC	Y
Eastern small-footed bat	*Myotis (=subulatus) leigii*	SC	Y
Kanawha minnow	*Phenacobius teretulus*	SC	Y
Grayson crayfish ostracod	*Ascetocythere cosmeta*	SR (PSC)	Y
Pygmy snaketail	*Ophiogomphus howei*	SR	Y
Diana fritillary butterfly	*Speyeria diana*	SR	Y
Regal fritillary butterfly	*Speyeria idala*	SR	N
"Fen" sedge	*Carex* sp. 2	SR-T	Y
Cuthbert's turtlehead	*Chelone cuthbertii*	SR-L	Y
Tall larkspur	*Delphinium exaltatum*	E-SC	Y
Gray's lily	*Lilium grayi*	T-SC	Y
Sweet pinesap	*Monotropsis odorata*	C	Y
Carolina saxifrage	*Saxifraga caroliniana*	C	Y
Keever's bristle moss	*Orthotrichum keeverae*	E	Y

**E-Endangered, T-Threatened, SC-Special Concern, C–Candidate, SR–Significantly Rare (with T-throughout or L-limited), P-Proposed*

One FSC species, hellbender, was identified within the project study area during the field effort. The specimen was captured, identified and released. This species is described below.

Hellbender: The hellbender is a slimy, large, grayish brown salamander, with large wrinkled folds of skin along the sides of its body. The folds of skin are used in respiration (Danch 1996). The hellbender can reach 12 to 29 inches (30.5 to 74.7 cm) in length and has a flat head with small, lidless eyes. Their legs are short and stout. This species prefers large, clear, fast-flowing streams with large, flat rocks and debris for cover (Behler and King 1997). Adults lack gills but have a gill slit on each side of the throat. Hellbenders are strictly carnivorous and may eat crayfish, earthworms and insects (Martof et al. 1980). The hellbender found during the May 1, 2001 field investigation was documented in Crab Creek approximately 50 feet (15.2 m) upstream of NC 18. NHP files have documented one other hellbender occurrence approximately 2.0 miles (3.2 km) west of the project study area in the Little River.

According to NHP files, there are three other FSC species occurrences within 3.0 miles (4.8 km) of the project study area. A 1963 occurrence of Kanawha minnow was documented 2.0 miles (3.2 km)

southwest of the project study area in the Little River. A 1998 occurrence of Kanawha minnow was documented in Glade Creek 2.3 miles (3.7 km) from the project study area. A 1991 occurrence of Gray's lily was documented near Brush Creek, 3.0 miles (4.8 km) west of the project study area. No other FSC species are known to occur within 3.0 miles (4.8 km) of the project study area.

3. Summary of Anticipated Impacts

Due to the federal status of the bog turtle [T(S/A)], this species is not subject to Section 7 consultation and a biological conclusion is not required. This project is not expected to affect the bog turtle. Potential habitat occurs for thirteen of the fourteen federal species of concern.

VI. CULTURAL RESOURCES

A. Compliance Guidelines

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR 800. Section 106 requires that for federally funded, licensed, or permitted projects having an effect on properties listed in or eligible for inclusion in the National Register of Historic Places, the Advisory Council on Historic Preservation be given the opportunity to comment.

B. Historic Architecture

A field survey of the Area of Potential Effect (APE) was conducted during December 2001. All structures within the APE were photographed during field visits to the site. The photographs were reviewed by a NCDOT staff architectural historian. This information was then forwarded to the State Historic Preservation Officer (SHPO). There were no properties considered eligible for inclusion on the National Register and the SHPO concurred with this determination in letters dated March 19, 2002 and June 26, 2002 contained in the Appendix.

C. Archaeology

The SHPO, in a memorandum dated September 23, 2002 recommended that "no archeological investigation be conducted in connection with this project." A copy of the SHPO memorandum is included in the Appendix.

VII. ENVIRONMENTAL EFFECTS

Field surveys were performed and a Hydraulic Technical Memorandum was produced for this project in September 2002. Alleghany County is a participant in the National Flood Insurance Program. Bridge No. 38 is not located in a 100-year Federal Emergency Management Agency (FEMA) floodplain (See Figure 7). There are no USGS gage sites on Crab Creek.

The project is expected to have an overall positive impact on the local area. Replacement of an inadequate bridge will result in safer and more efficient traffic operations.

The project is considered to be a Federal "Categorical Exclusion" due to its limited scope and lack of substantial environmental consequences.

The bridge replacement will not have an adverse effect on the quality of the human or natural environment with the use of the current NCDOT standards or specifications.

The project is not in conflict with any plan, existing land use, or zoning regulation. No change in land use is expected to result from the construction of the project (Alleghany County Manager's Office, Ms. Karen Evans, Administrative Assistant to the County Manager).

There is a one story frame dwelling and small one story block business located on the northwest and a 1.5 story frame dwelling on the northeast of Bridge No. 38. All properties have driveways entering into the existing NC 18. Right-of-way acquisition will be limited.

No adverse effect on public facilities or services is anticipated. The project is not expected to adversely affect social, economic, or religious opportunities in the surrounding area.

No geodetic survey markers will be impacted.

The studied route does not contain any bicycle accommodations, nor is it a designated bicycle route; therefore, no bicycle accommodations have been included as part of this project.

The proposed project will not require right-of-way acquisition or easement from any land protected under Section 4(f) of the Department of Transportation Act of 1966.

This project has been coordinated with the NRCS. The Farmland Protection Policy Act requires all Federal agencies or their representatives to consider the potential impact to prime farmland of all land acquisition and construction projects. There are soils classified as prime, unique, or having state or local importance in the vicinity of the project. Within the 0.5-mile (0.80 km) search radius, the prime farmland soil, Cy, was found. Also, state and local important soils, CeC, WaC, TIC, TaD, TaC, and CmC, were found. Within the project study area, Cy - Comus fine sandy loam, CeE - Chester loam (10 to 25% slopes), and TaD - Tate loam (10 to 15 percent slopes) were found (see Figure 6).

This project is in an air quality "neutral" project, so it is not required to be included in the regional emissions analysis and a project level CO analysis is not required.

This project is located in Alleghany County, which has been determined to be in compliance with the National Ambient Air Quality Standards. 40 CFR 51 is not applicable because the proposed project is located in an attainment area. If vegetation is disposed of by burning, all burning shall be done in accordance with applicable local laws and regulations of the North Carolina State Implementation Plan (SIP) for air quality in compliance with 15 NCAC2D.0520.

Noise levels could increase during construction but will be temporary. This evaluation completes the assessment requirements for highway traffic noise of 23 CFR 772 and for air quality (1190 Clean Air Act Amendments and the National Environmental Policy Act) and no additional reports are required.

A search was performed of the project study area utilizing the ASTM Standard Practice for Environmental Site Assessments (E 1527-00). This search included the NPL (National Priority List), CERCLIS (Comprehensive Environmental Response, Compensation, and Liability Information System), RCRIS (Resource Conservation and Recovery Information), and UST (Petroleum Underground Storage Tank Database) as well as other applicable databases. There is one mapped Ground Water Incident located northeast of Bridge No. 38 located approximately 2,345 feet (714.8 m) from the project study area. The search documented no other mapped sites found on the target site or within the 0.5-mile (0.80 km) ASTM search radius.

Alleghany County is a participant in the National Flood Insurance Regulatory Program (FIRM). The approximate 100-year floodplain in the project area is shown on Figure 7. There are no other practical alternatives to crossing the floodplain area.

On the basis of the above discussion, it is concluded that no significant adverse environmental effects will result from implementation of the proposed project.

In compliance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations) a review was conducted to determine whether minority of low-income populations were receiving disproportionately high and adverse human health and environmental impacts as a result of this project. The investigation determined the project would not disproportionately impact any minority or low-income populations.

There are no publicly owned parks, recreational facilities, or wildlife and waterfowl refuges or national, state, or local significance in the immediate vicinity of the project.

An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Environmental Management, Groundwater Section and the North Carolina Department of Human Resources, Solid Waste Management Section revealed no underground storage tanks or hazardous waste sites in the project area.

VIII. PUBLIC INVOLVEMENT

Public involvement for this project initially involved compiling a database of property owners, area business persons and local public officials. This database was used to send out Newsletter No. 1 in October 2001 announcing the project and detailing the three alternatives being considered. A copy of the newsletter is included in the Appendix. No other comments or questions were received from local public officials or citizens.

IX. AGENCY COMMENTS

Agencies have commented upon the proposed bridge replacement. These comments were noted, considered in the environmental and design processes, and included in the Appendix.

X. SECTION 4(F) RESOURCES

Section 4(f) of the Department of Transportation Act of 1966, as amended, states in part "The Secretary may approve a transportation project or program requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge, or land of a historic site of national, state,

or local significance (as determined by the Federal, State or local officials having jurisdiction over the park, recreation area, refuge, or site) only if –

(1) there is no prudent and feasible alternative to using land; and

(2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from such use."

There are no properties protected under Section 4(f) that will be affected by the proposed project. Therefore, a Section 4(f) Evaluation is not required.

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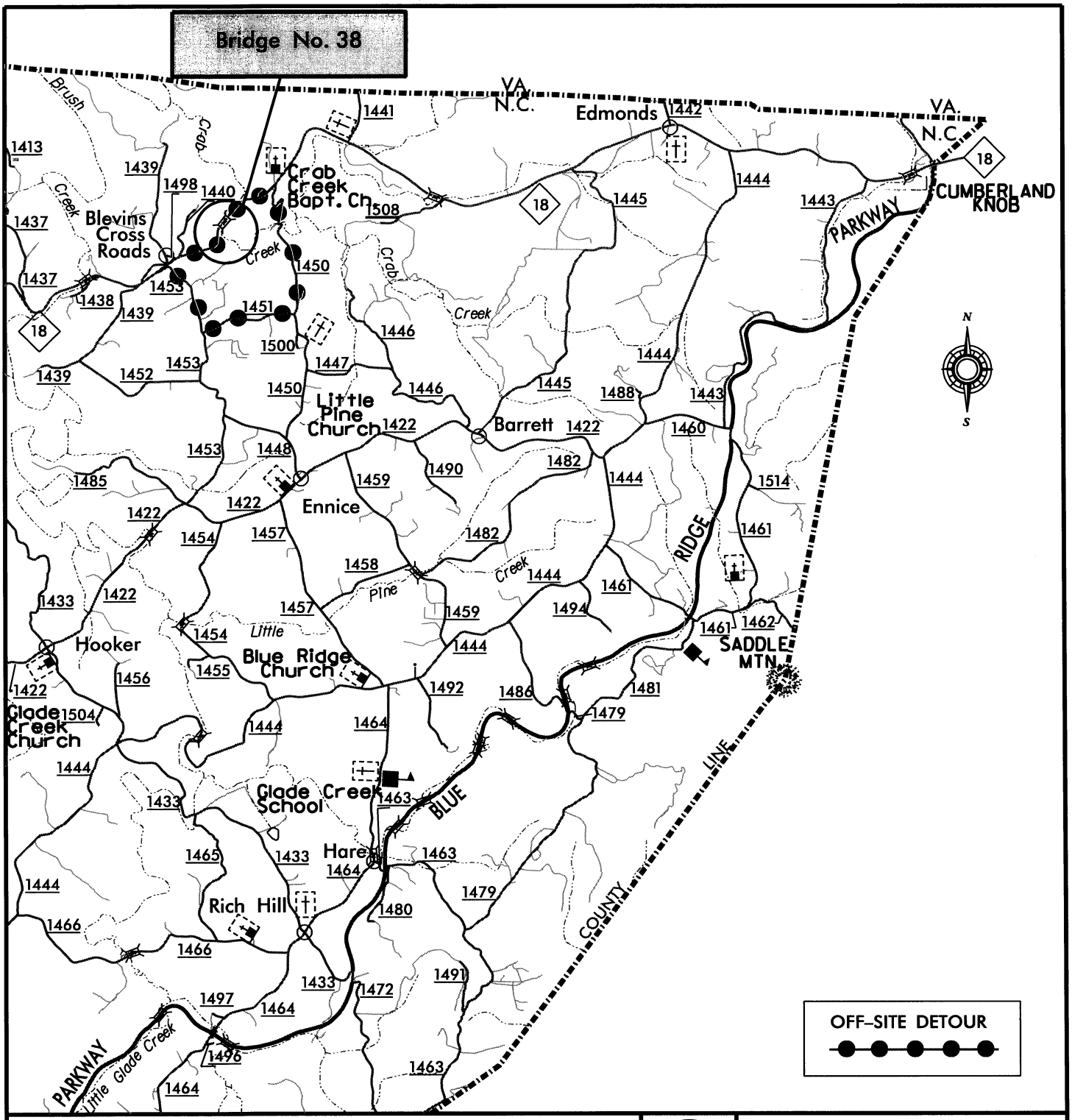
EXHIBITS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Blevins Cross Roads
Creek
Crab Creek
Little Pine Church
Barrett
Ennice
Pine Creek
Little Blue Ridge Church
Hooker
Glade Creek Church
Glade Creek School
Harer
Rich Hill
Little Glade Creek
PARKWAY
RIDGE
SADDLE MTN.
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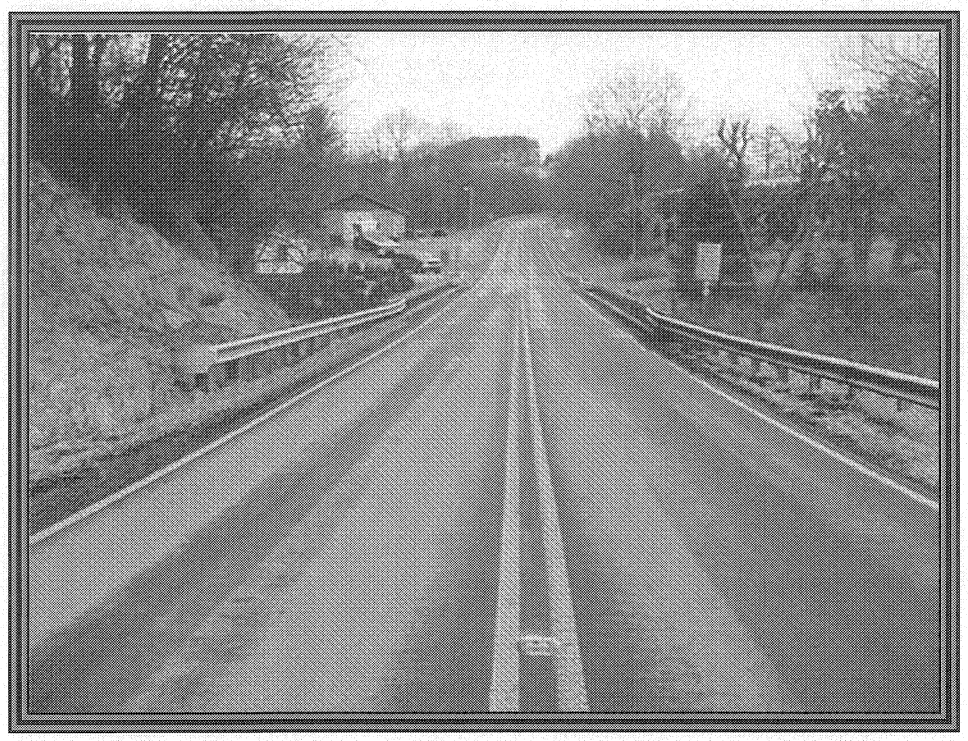
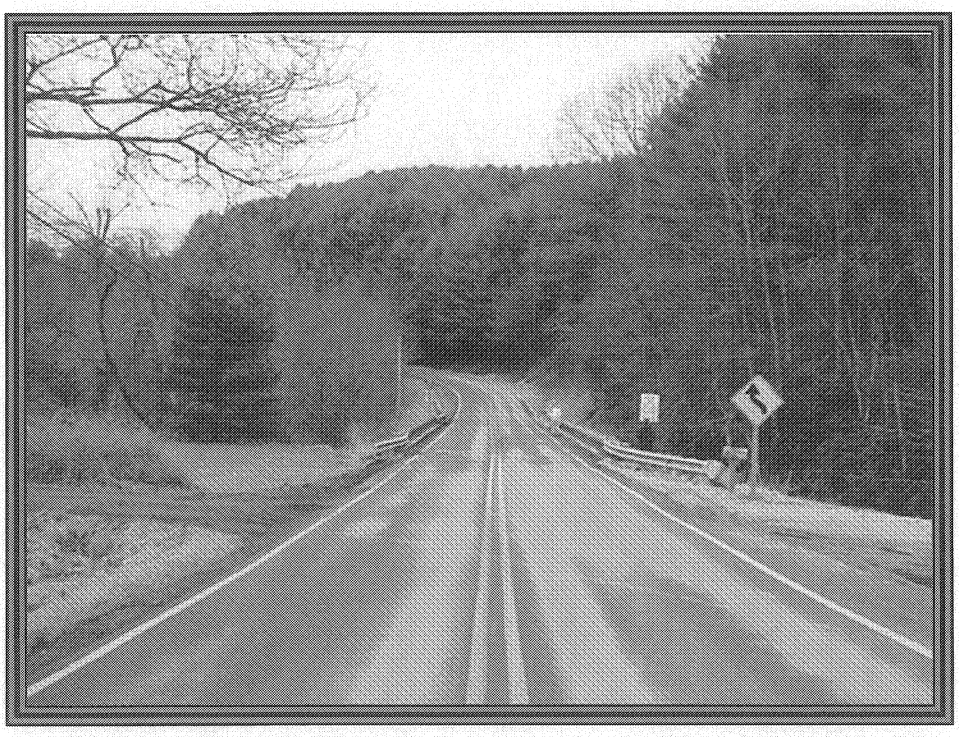
221
ALLEGHANY CO.
North Carolina Department of Transportation
Project Development and
Environmental Analysis Branch
ALLEGHANY COUNTY
BRIDGE No. 38 on NC 18
over CRAB CREEK
T.I.P. No. B-4007
FIGURE 1

ALLEGHANY COUNTY
BRIDGE No. 38
B-4007

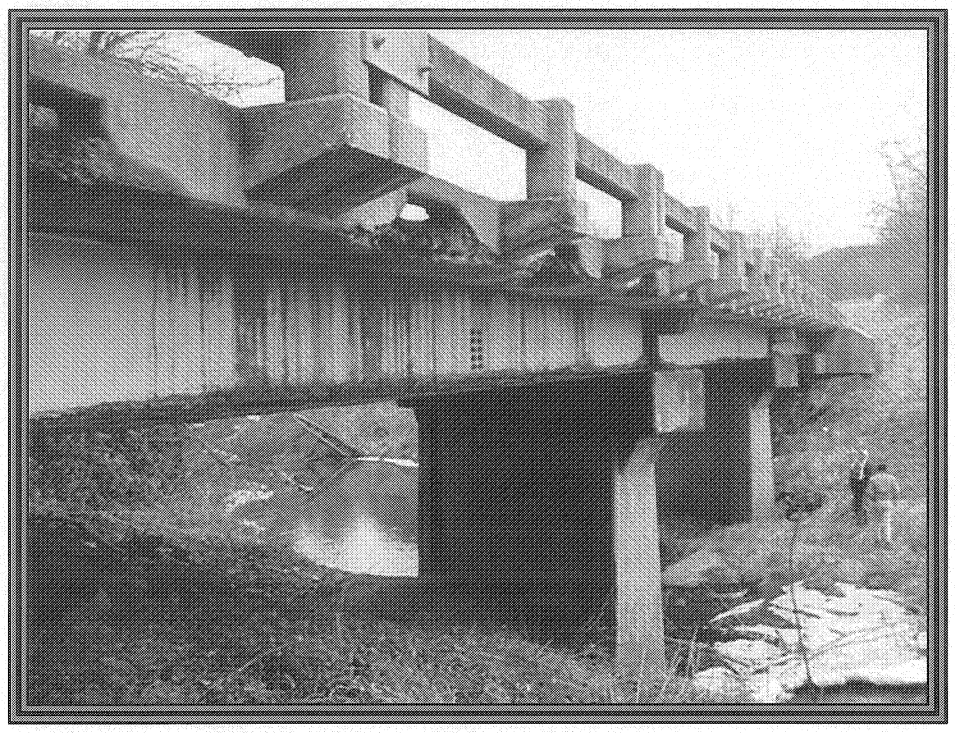


Looking North



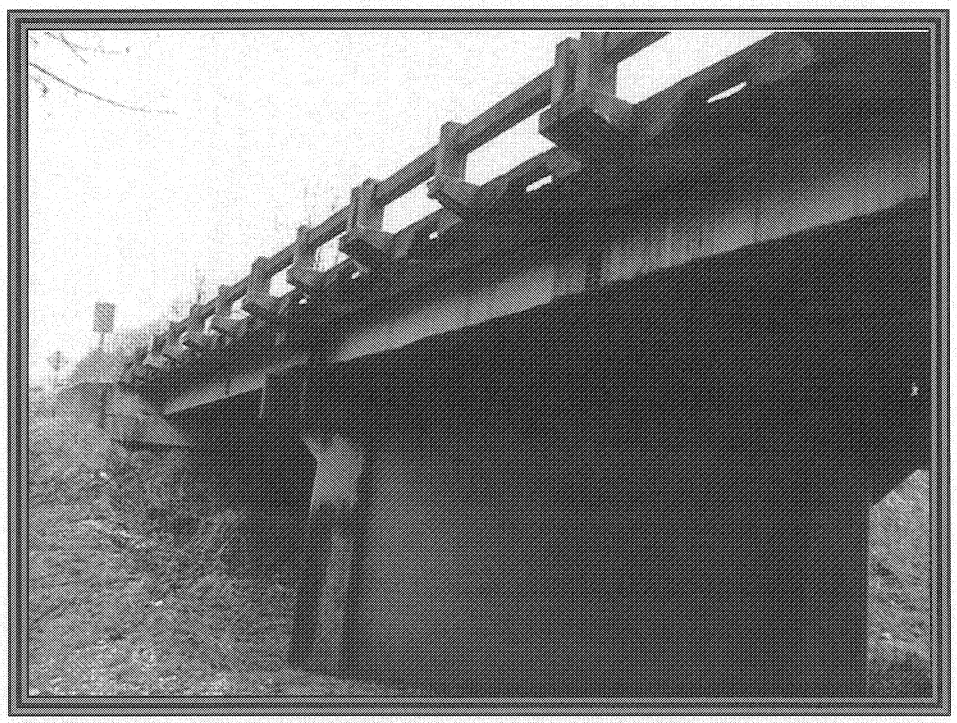
Looking South

Figure 2a



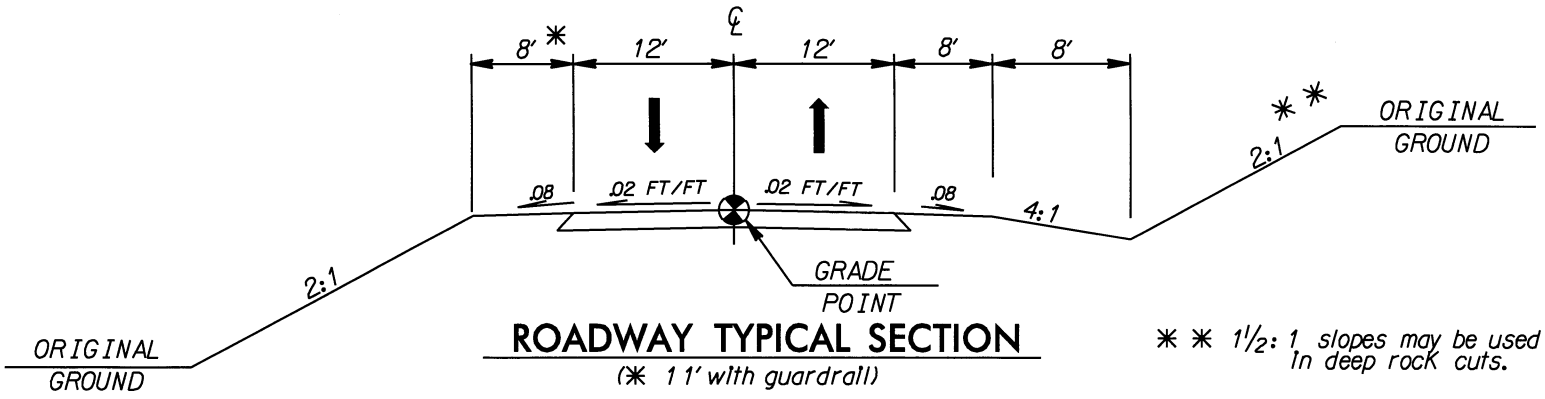
ALLEGANY COUNTY
BRIDGE No. 38
B-4007

Looking at Eastern side



Looking at Western side

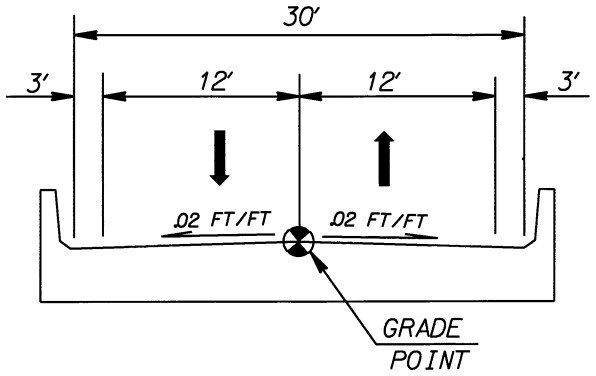
Figure 2b



ROADWAY TYPICAL SECTION

(* 11′ with guardrail)

* * 1½: 1 slopes may be used in deep rock cuts.



TYPICAL BRIDGE SECTION

EXISTING BRIDGE LENGTH IS 135 FT.

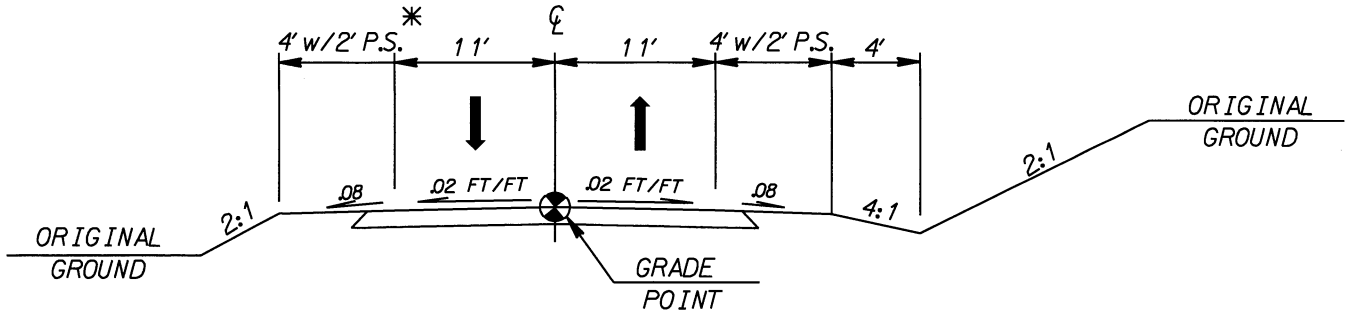
North Carolina Department of Transportation
Project Development and
Environmental Analysis Branch

ALLEGHANY COUNTY

BRIDGE No. 38 on NC 18
over CRAB CREEK

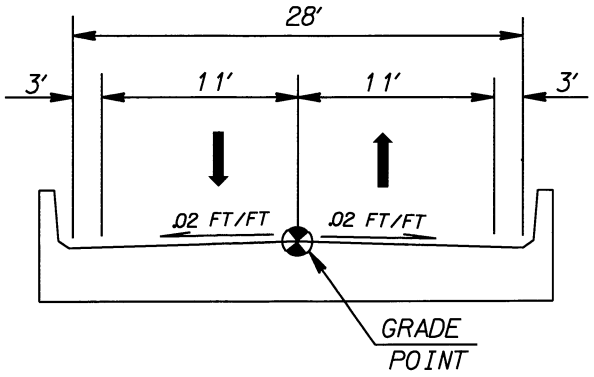
T.I.P. No. B-4007

FIGURE 3a



DETOUR ROADWAY TYPICAL SECTION

(* 6' with guardrail)



TYPICAL DETOUR BRIDGE SECTION

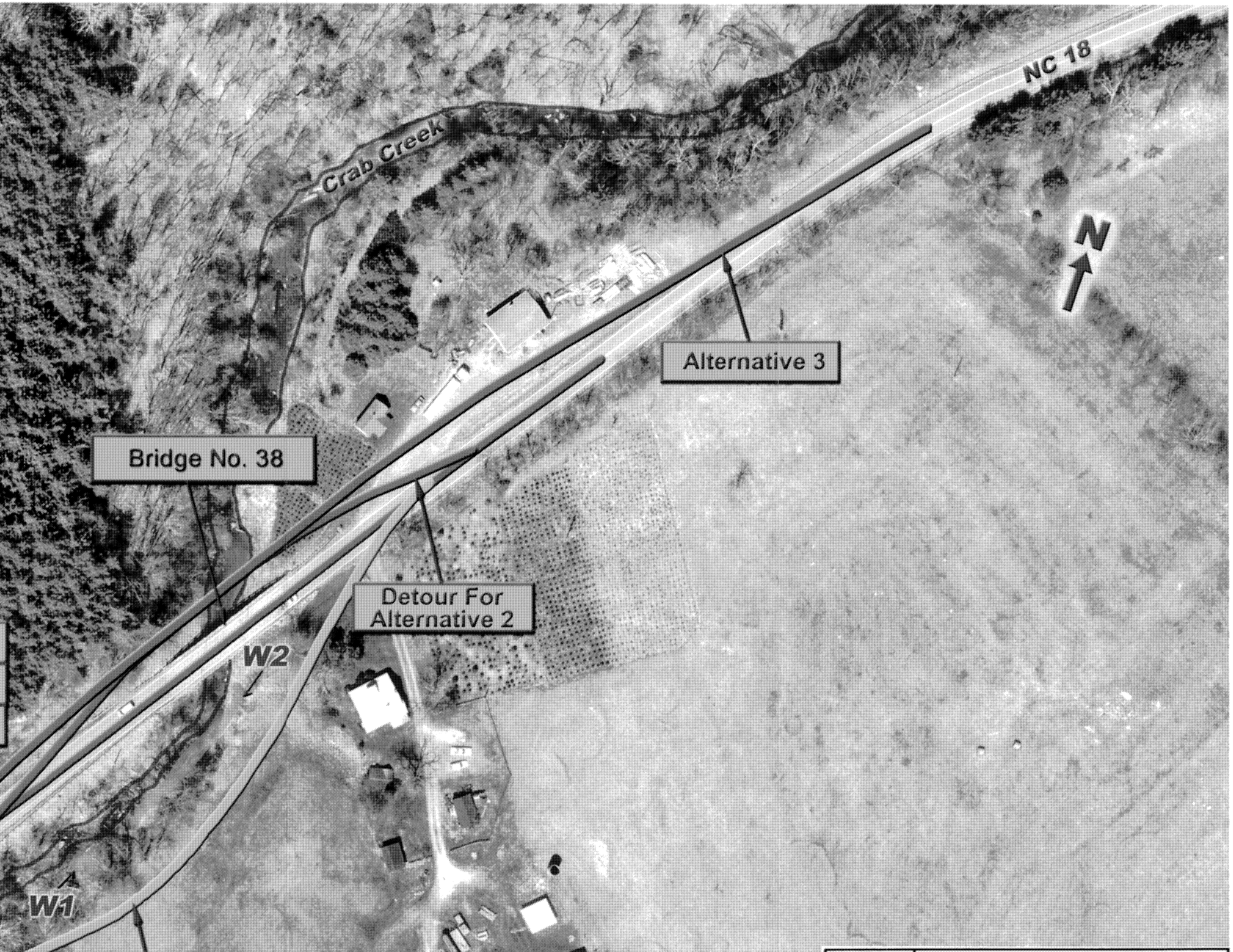
North Carolina Department of Transportation
Project Development and
Environmental Analysis Branch

ALLEGHANY COUNTY

BRIDGE No. 38 on NC 18
over CRAB CREEK

T.I.P. No. B-4007

FIGURE 3b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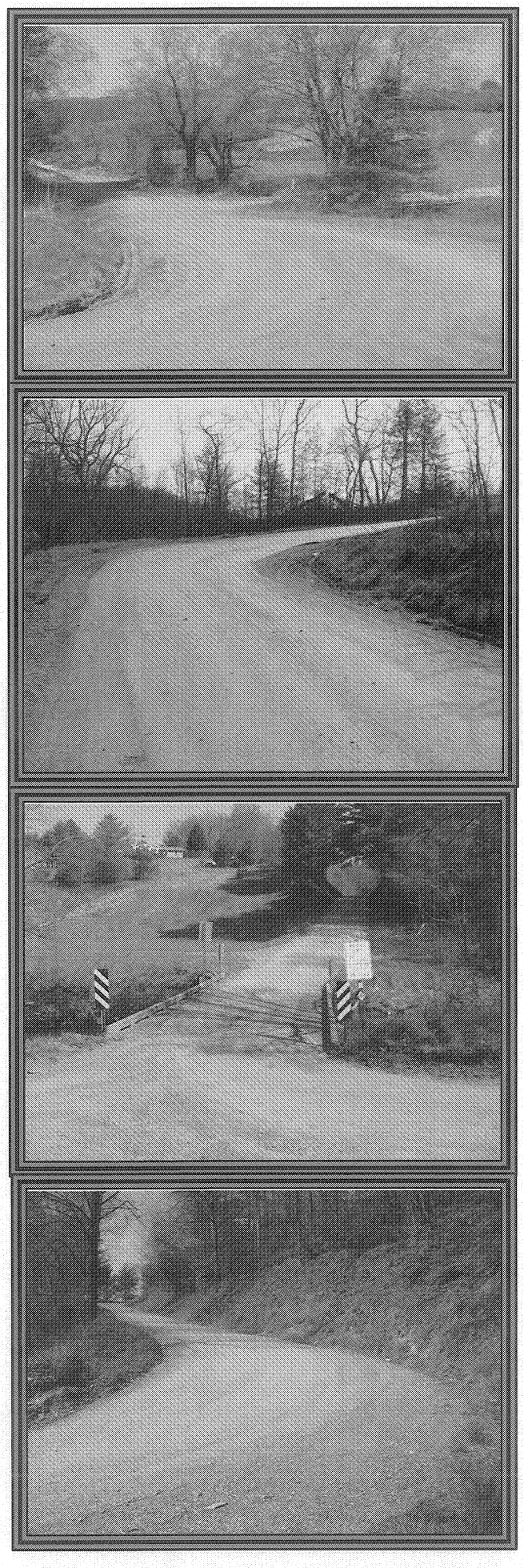


ALLEGHANY COUNTY
T.I.P. No. B-4007
Bridge No. 38 on NC 18

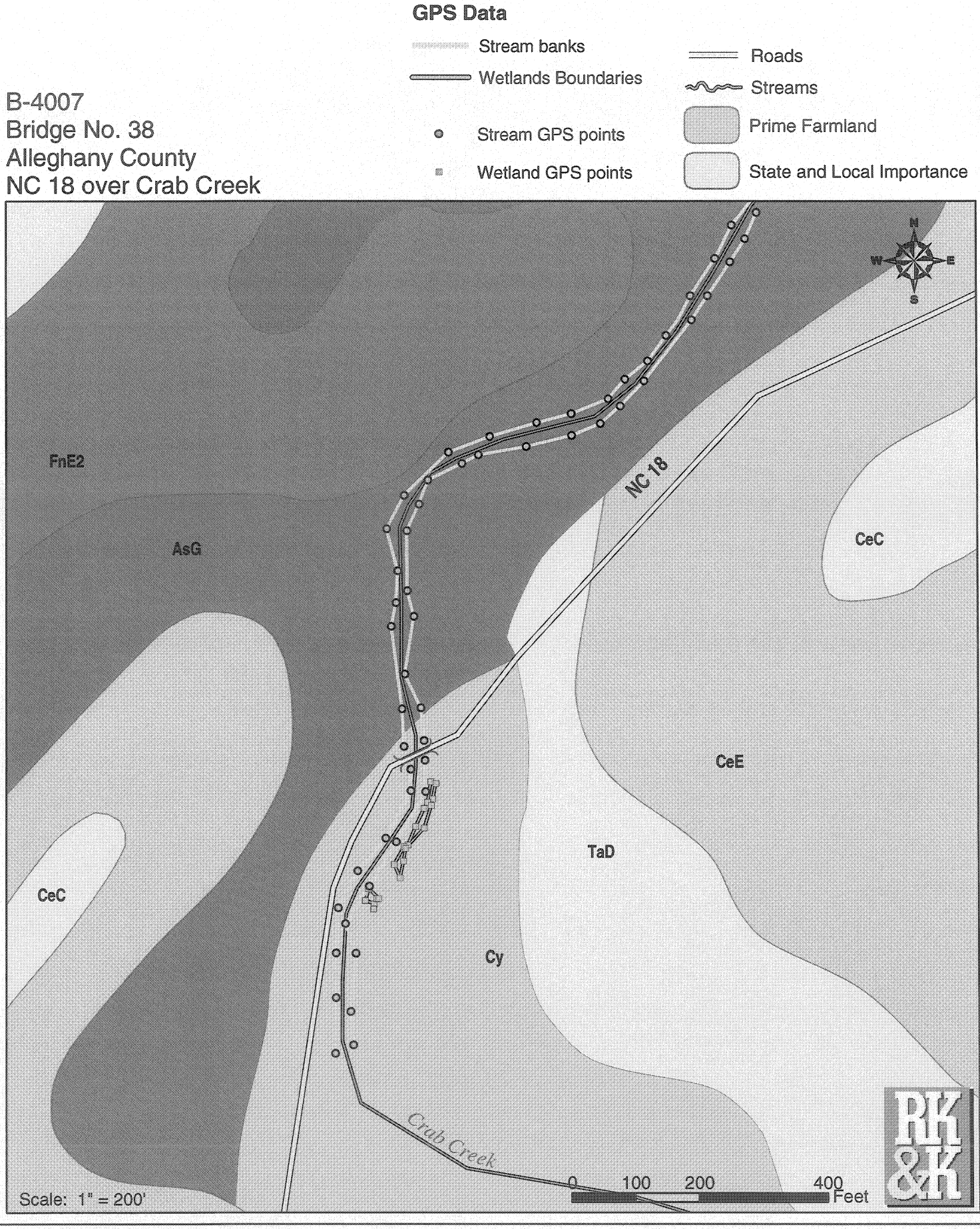
Photographs of unpaved portion of Old Ennice Road (SR 1450) along the off-site detour.

Figure 5

GPSed Streams and Wetlands

Figure 6

B-4007
Bridge No. 38
Alleghany County
NC 18 over Crab Creek



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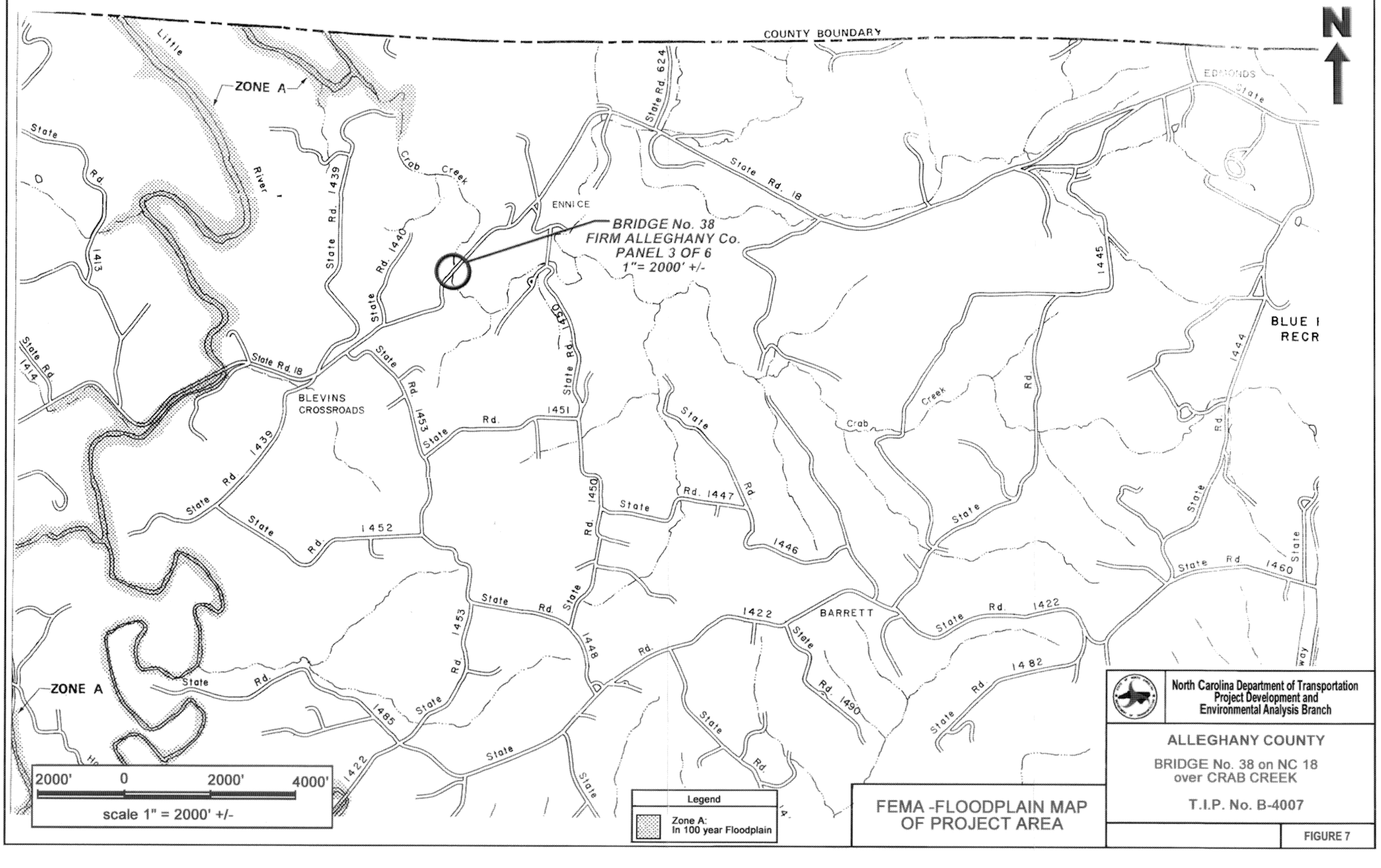


FEMA -FLOODPLAIN MAP OF PROJECT AREA

North Carolina Department of Transportation
Project Development and
Environmental Analysis Branch

ALLEGHANY COUNTY

BRIDGE No. 38 on NC 18
over CRAB CREEK

T.I.P. No. B-4007

FIGURE 7

APPENDIX

North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

TO: Ms. Kim Leight
Rummel, Klepper & Kahl

FROM: Maryellen Haggard, Highway Project Coordinator
Habitat Conservation Program

DATE: August 6, 2001

SUBJECT: NCDOT Bridge Replacements in Ashe, Wilkes, Watauga, and Alleghany counties of North Carolina. TIP Nos. B-3300, B-3607, B-3714, B-3922, B-3925, B-3926, B-3928, B-4007, and B-4010

Biologists with the N. C. Wildlife Resources Commission (NCWRC) have reviewed the information provided and have the following preliminary comments on the subject project. Our comments are provided in accordance with provisions of the National Environmental Policy Act (42 U.S.C. 4332(2)(c)) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

On bridge replacement projects of this scope our standard recommendations are as follows:

1. We generally prefer spanning structures. Spanning structures usually do not require work within the stream and do not require stream channel realignment. The horizontal and vertical clearances provided by bridges allows for human and wildlife passage beneath the structure, does not block fish passage, and does not block navigation by canoeists and boaters.

2. Bridge deck drains should not discharge directly into the stream.

3. Wet concrete should not be allowed to contact stream water. This will lessen the chance of altering the stream's water chemistry and causing a fish kill.

4. If possible, bridge supports (bents) should not be placed in the stream.

5. If temporary access roads or detours are constructed, they should be removed back to original ground elevations immediately upon the completion of the project. Disturbed areas should be seeded or mulched to stabilize the soil and native tree species should

be planted with a spacing of not more than 10'x10'. If possible, when using temporary structures the area should be cleared but not grubbed. Clearing the area with chain saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact, allows the area to revegetate naturally and minimizes disturbed soil.

6. A clear bank (riprap free) area of at least 10 feet should remain on each side of the stream underneath the bridge.

7. In trout waters, the N.C. Wildlife Resources Commission reviews all U.S. Army Corps of Engineers nationwide and general '404' permits. We have the option of requesting additional measures to protect trout and trout habitat and we can recommend that the project require an individual '404' permit.

8. In streams that contain threatened or endangered species, NCDOT biologist Mr. Tim Savidge should be notified. Special measures to protect these sensitive species may be required. NCDOT should also contact the U.S. Fish and Wildlife Service for information on requirements of the Endangered Species Act as it relates to the project.

9. In streams that are used by anadromous fish, the NCDOT official policy entitled "Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997)" should be followed.

10. In areas with significant fisheries for sunfish, seasonal exclusions may also be recommended.

11. Sedimentation and erosion control measures sufficient to protect aquatic resources must be implemented prior to any ground disturbing activities. Structures should be maintained regularly, especially following rainfall events.

12. Temporary or permanent herbaceous vegetation should be planted on all bare soil within 15 days of ground disturbing activities to provide long-term erosion control.

13. All work in or adjacent to stream waters should be conducted in a dry work area. Sandbags, rock berms, cofferdams, or other diversion structures should be used where possible to prevent excavation in flowing water.

14. Heavy equipment should be operated from the bank rather than in stream channels in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into streams.

15. Only clean, sediment-free rock should be used as temporary fill (causeways), and should be removed without excessive disturbance of the natural stream bottom when construction is completed.

16. All mechanized equipment operated near surface waters should be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials.

If corrugated metal pipe arches, reinforced concrete pipes, or concrete box culverts are used:

1. The culvert must be designed to allow for fish passage. The culvert or pipe invert should be buried at least 1 foot below the natural streambed. The installation of the culvert or pipe should insure that all waters flow without freefalling or damming on either end during low flow conditions. If culverts are long, notched baffles should be placed in reinforced concrete box culverts at 15 foot intervals to allow for the collection of sediments in the culvert, to reduce flow velocities, and to provide resting places for fish and other aquatic organisms moving through the structure.

2. When two pipes are installed, only the lower pipe should be buried 12" into the substrate so that all base flows continue uninterrupted in the lower pipe during normal and low flow conditions to maintain aquatic life passage. The bottom of the second pipe should be placed at grade or at bankfull elevation. The second pipe should remain dry during normal flows to allow for wildlife passage. Where disrupted, natural floodplain benching should be restored upstream and downstream of the second, "dry", pipe.

3. Culverts or pipes should be situated so that no channel realignment or widening is required. Widening of the stream channel at the inlet or outlet of structures usually causes a decrease in water velocity causing sediment deposition that will require future maintenance.

4. Riprap should not be placed on the streambed.

In most cases, we prefer the replacement of the existing structure at the same location with road closure. If road closure is not feasible, a temporary detour should be designed and located to avoid wetland impacts, minimize the need for clearing and to avoid destabilizing stream banks. If the structure will be on a new alignment, the old structure should be removed and the approach fills removed from the 100-year floodplain. Approach fills should be removed down to the natural ground elevation. The area should be stabilized with grass and planted with native tree species. If the area that is reclaimed was previously wetlands, NCDOT should restore the area to wetlands. If successful, the site may be used as wetland mitigation for the subject project or other projects in the watershed.

Project specific comments:

1. B-3300 – Ashe County – Bridge No. 57 over Buffalo Creek. Buffalo Creek at this location in all likelihood contains wild trout. The bridge is located at a major intersection. A culvert would be a hindrance to fish as well as wildlife passage. We will require a trout moratorium from Oct. 15th - April 15th.

2. B-3607 – Ashe County – Bridge No. 503 over Buffalo Creek. Buffalo Creek at the bridge replacement in all likelihood contains wild trout. We will require a trout moratorium from Oct. 15th - April 15th.

3. B-3714 – Wilkes County – Bridge No. 83 over Mulberry Creek. Mulberry Creek supports small mouth bass and redbreast sunfish at this location. We will require a moratorium from May 1st - June 30th.

4. B-3922 – Watauga County – Bridge No. 316 over Cove Creek. Cove Creek is designated Public Mountain Trout Water. In addition to stocked fish, it contains some wild brown trout. We will require a trout moratorium from Oct. 15th - April 15th. The bridge should be replaced with another bridge. We are concerned that a box culvert will impede fish passage.

5. B-3925 – Watauga County – Bridge No. 35 over Meat Camp Creek. Meat Camp Creek is designated Public Mountain Trout Water. In addition to stocked fish, it contains some wild brown trout. We will require a trout moratorium from Oct. 15th - April 15th. The bridge should be replaced with another bridge. We are concerned that a box culvert will impede fish passage.

6. B-3926 – Watauga County – Bridge No. 36 over Meat Camp Creek. Same comments as B-3925.

7. B-3928 – Watauga-Ashe County – Bridge No. 334 over South Fork New River. We will require a small mouth bass/ rock bass moratorium from May 1st - June 30th. The South Fork New River is high quality water and designated "scenic" by the National Wild and Scenic Rivers System. The bridge should be replaced with another bridge. This is a popular canoe section; the new bridge should be at the appropriate height so boaters do not have to portage.

8. B-4007 – Alleghany County – Bridge No. 38 over Crab Creek. Crab Creek is in a High Quality Water Zone and is designated Hatchery Supported Water. We will require a trout moratorium from Oct. 15th - April 15th.

9. B-4010 – Ashe County – Bridge No. 7 over South Fork New River. We will require a small mouth bass/ rock bass moratorium from May 1st - June 30th. The South Fork New River is high quality water and designated "scenic" by the National Wild and Scenic Rivers System. The bridge should be replaced with another bridge.

We request that NCDOT routinely minimize adverse impacts to fish and wildlife resources in the vicinity of bridge replacements. The NCDOT should install and maintain sedimentation control measures throughout the life of the project and prevent wet concrete from contacting water in or entering into these streams. We are comfortable with the bridge demolition proposed, but are concerned about aquatic life passage with the new structure. Replacement of bridges with spanning structures of some type, as opposed to pipe or box culverts, is recommended in most cases. Spanning structures allow wildlife passage along streambanks; reducing habitat fragmentation and vehicle related mortality at highway crossings.

If you need further assistance or information on NCWRC concerns regarding bridge replacements, please contact me at (336) 527-1549. Thank you for the opportunity to review and comment on these projects.

300-104
ESM
KSL

Michael F. Easley, Governor
William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Gregory J. Thorpe, Ph.D.
Acting Director
Division of Water Quality

August 15, 2001

MEMORANDUM

To: Elmo Vance, NCDOT Project Development & Environmental Analysis Branch
Through: John Dorney, NC Division of Water Quality
From: Cynthia F. Van Der Wiele, NCDOT Coordinator

Subject: Scoping Comments for Eleven Bridge Replacement Projects

This memo is in reference to your correspondence dated July 23, 2001, in which you requested scoping comments for the above projects. The Division of Water Quality (DWQ) requests that the following topics be addressed:

1. Bridge projects shall comply with the requirements for Water Supply Watershed, High Quality Waters and Outstanding Resource Waters with regards to stormwater management, sedimentation and erosion control and buffer requirements.
2. Ensure that sediment & erosion control measures are not placed in wetlands.
3. Borrow/waste areas should avoid wetlands to the maximum extent practicable. Prior to the approval of any borrow/waste site in a wetland, the contractor must obtain a 401 certification from DWQ.
4. The DWQ prefers that the structures that will be replacing the eleven deficient bridges will be bridges. All structures shall be installed in such a manner that the original stream profiles are not altered (i.e. the depth of the channel must not be reduced by a widening of the streambed). Existing stream dimensions are to be maintained above and below locations of culvert extensions.
5. All work shall be performed during low flow conditions.
6. Disturbance of the stream channels must be limited to only what is necessary to perform the bridge demolition and removal. Heavy equipment must be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into the stream.
7. All mechanized equipment operated near surface waters should be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials.
8. Written concurrence of 401 Water Quality Certification may be required for these projects (e.g., applications requesting coverage under NW 14 or Regional General Permit 198200031). Please be aware that 401 certification may be denied if wetland or water impacts have not been avoided and minimized to the maximum extent practicable.

Thank you for requesting our input at this time. The DOT is reminded that issuance of a 401 Water Quality Certification requires that appropriate measures be instituted to ensure that water quality standards are met and designated uses are not degraded or lost. If you have any questions or require additional information, please contact Cynthia Van Der Wiele at (919) 733.5715.

Pc: Eric Alsmeyer, USACE Raleigh Field Office
Steve Lund, USACE Asheville Field Office
Tom McCartney, USFWS Raleigh Field Office
Marella Buncick, USFWS Asheville Field Office
MaryEllen Haggard, NCWRC
File Copy

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 19, 2002

Mr. David L. S. Brook
Deputy State Historic Preservation Officer
North Carolina Department of Cultural Resources
4617 Mail Service Center
Raleigh, North Carolina 27699-4617

Dear Mr. Brook:

RE: **B-4007, Replace Bridge No. 38 on NC 18 over Crab Creek, Alleghany County, NC. State Project # 8.1701201, Federal Aid #BRSTP-18-(8).**

The North Carolina Department of Transportation (NCDOT) is conducting planning studies for the above-referenced project. Please find attached three copies of the Historic Architectural Resources Survey Report, which meets the guidelines for survey procedures for NCDOT and the National Park Service.

This report concludes that in the Area of Potential Effects (APE) there are no properties eligible for the National Register.

Please review the survey report and provide us with your comments. If you have any questions concerning the accompanying information, please contact Richard Silverman, Historic Architecture Section, (919) 733-7844, ext.298.

Sincerely,

Mary Pope Furr, Supervisor
Historic Architecture Section
Project Development & Environmental Analysis Branch

MPF/rls
Attachment
cc Gail Grimes, P.E., Assistant Branch Manager, PDEA
Nicholas Graf, P.E., Federal Highway Administration

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1548 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-733-3141
FAX: 919-733-9794

WEBSITE: WWW.NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

North Carolina Department of Cultural Resources
State Historic Preservation Office
David L. S. Brook, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Division of Historical Resources
David J. Olson, Director

September 23, 2002

MEMORANDUM

TO: Drew Joyner
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: David Brook for David Brook

SUBJECT: B-4007, Alleghany County, ER 02-7219

Thank you for providing the additional information on the above project. Based on the information provided no archaeological survey is needed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Matt Wilkerson, NCDOT

D. Joyner

North Carolina Department of Cultural Resources
State Historic Preservation Office
David L. S. Brook, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary
Office of Archives and History

Division of Historical Resources
David J. Olson, Director

RECEIVED
JUL 1 2002
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

June 26, 2002

MEMORANDUM

TO: William D. Gilmore, Manager
Project Development and Environmental Analysis Branch
Department of Transportation, Division of Highways

FROM: David Brook for David Brook

SUBJECT: Historical Architectural Survey Report, Replace Bridge No. 38 on NC 18 over Crab Creek, B-4007, Alleghany County, ER 02-9333

Thank you for your letter of March 19, 2002, transmitting the survey report by Richard Silverman, NCDOT. We regret that staff vacancies prevented our responding in a timelier manner.

For purposes of compliance with Section 106 of the National Historic Preservation Act, we concur that the following properties are not eligible for listing in the National Register of Historic Places:

- Eugene Edwards Property (Gas Station)
- Bridge No. 38 on NC 18 over Crab Creek

The above comments are made pursuant to Section 106 of National Historic Preservation Act and Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Mary Pope Furr, NCDOT

	Location	Mailing Address	Telephone/Fax
Administration	507 N. Blount St, Raleigh, NC	4617 Mail Service Center, Raleigh 27699-4617	(919) 733-4763 •733-8653
Restoration	515 N. Blount St, Raleigh , NC	4613 Mail Service Center, Raleigh 27699-4613	(919) 733-6547 •715-4801
Survey & Planning	515 N. Blount St, Raleigh, NC	4618 Mail Service Center, Raleigh 27699-4618	(919) 733-4763 •715-4801

ALLEGHANY
COUNTY SCHOOLS

Board of Education
Charles Joines, Chairperson
David Caldwell, Vice Chairperson
Gary Murphy
Steve Carpenter
Sonia Joines

Duane J. Davis, Superintendent

February 15, 2001

Elizabeth Mack
Rummel, Klepper & Kahl, LLP
5800 Faringdon Place, Suite 105
Raleigh, NC 27609

RE: Bridge No. 38 on NC 18 over Crab Creek

Dear Ms. Elizabeth Mack:

The information I called to you Monday was not correct. I called the bus drivers to be sure, and we have 2 buses that cross the bridge daily. The high school bus makes 2 trips daily and the elementary school bus makes 4 trips daily, for a total of 6 trips. I also checked the detour mileage, which is 3.5 miles one way.

Hope this information will help. If you need any more information, please contact me at (336) 372-8594.

Sincerely,

Claude Nunley

Claude Nunley
Transportation Director

CN/jn

cc

Alleghany County Board of Commissioners

90 South Main Street
Post Office Box 366
Sparta, North Carolina 28675
Tel: (336) 372-4179
Fax: (336) 372-5969

March 5, 2001

Rummel, Klepper & Kahl
Attn: Elizabeth Mack
5800 Faringdon Place, Ste. 105
Raleigh, NC 27609-3960

Dear Ms. Mack:

In reference to the letter dated February 26, 2001, concerning bridge number 38 located on NC 18 over Crab Creek. Alleghany County doesn't have any water, sewer or natural gas lines running near the bridge. If you have any questions, please contact me at (336) 372-4179.

Sincerely,

Don Adams
County Manager

JDA/kle

REPLACEMENT OF BRIDGE NO. 38 OVER CRAB CREEK

Alleghany County, North Carolina

October 2001 | *T.I.P. No. B-4007* | *Newsletter No. 1*

NCDOT to Replace Bridge No. 38

This newsletter is published by the North Carolina Department of Transportation (NCDOT) to inform citizens about the proposed replacement of Bridge No. 38 on NC 18 over Crab Creek (tributary to the New River) in Alleghany County. Right-of-way acquisition and construction are scheduled to begin in 2003 and 2004, respectively.

Planning Studies Initiated

During Step 1 of the planning process, information was collected on the existing human and natural environments. This information was used to identify preliminary alternatives for replacing Bridge No. 38. In Step 2, the preliminary alternatives were evaluated and, based on their potential impacts, three "reasonable and feasible" alternatives were selected for detailed environmental studies. Step 3 involves conducting detailed environmental studies for the "reasonable and feasible" alternatives. Following completion of the detailed studies, Step 4 will consist of selecting the preferred alternative. Step 5 will be the completion of the environmental document.

PROJECT SCHEDULE

The schedule for the project is shown below:

Fall 2002	Complete Environmental Document
Fall 2002	Select Preferred Alternative
2003	Begin Right-of-Way Acquisition
2004	Begin Construction

HOTLINE

A project HOTLINE has been established to provide a toll free telephone number for information requests. Please call (888) 521-4455 for information regarding the replacement of Bridge No. 38 over Crab Creek (T.I.P. No. B-4007).

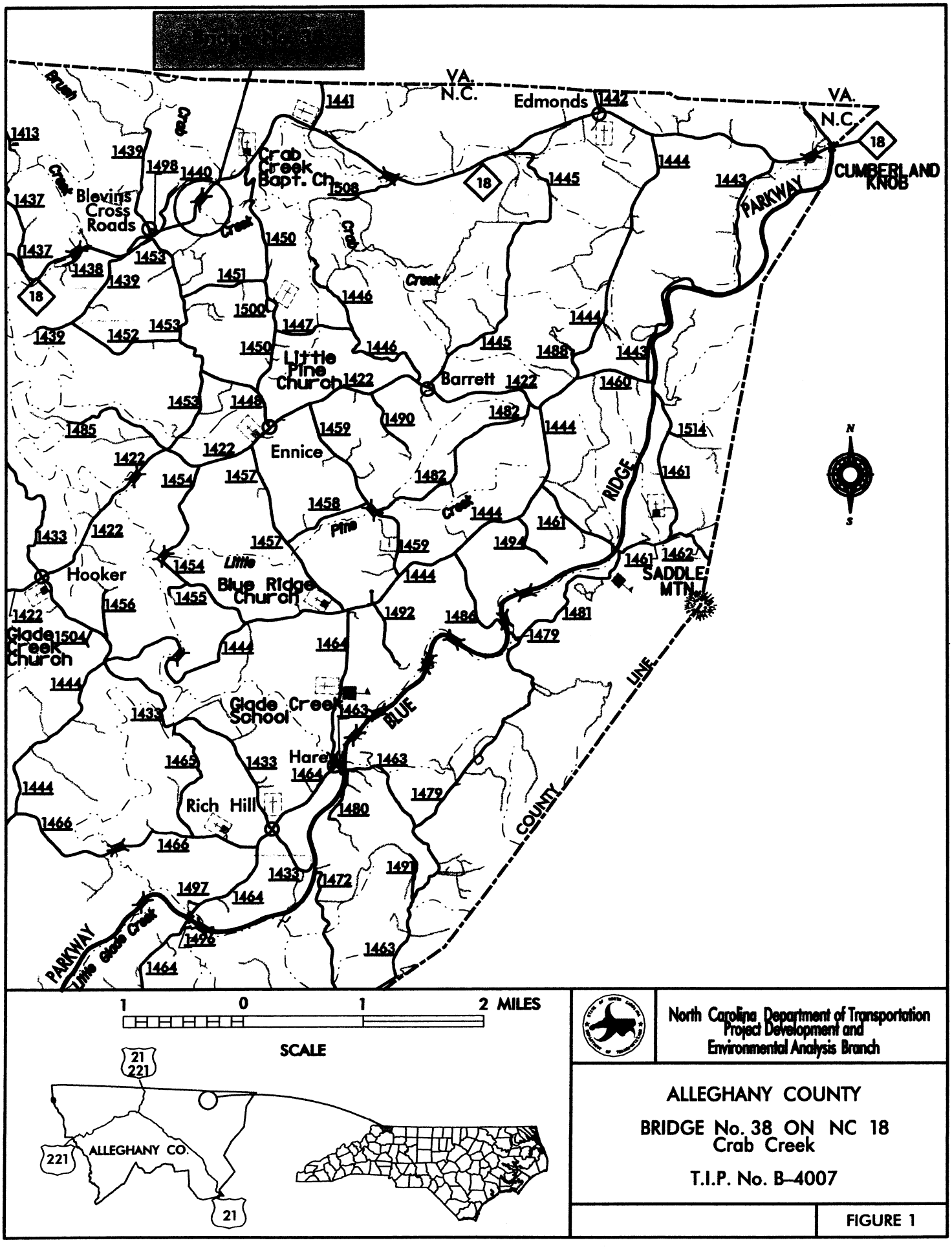
Description of Alternatives

Three "reasonable and feasible" alternatives will be evaluated in detail during the planning and environmental process. These alternatives are briefly described below:

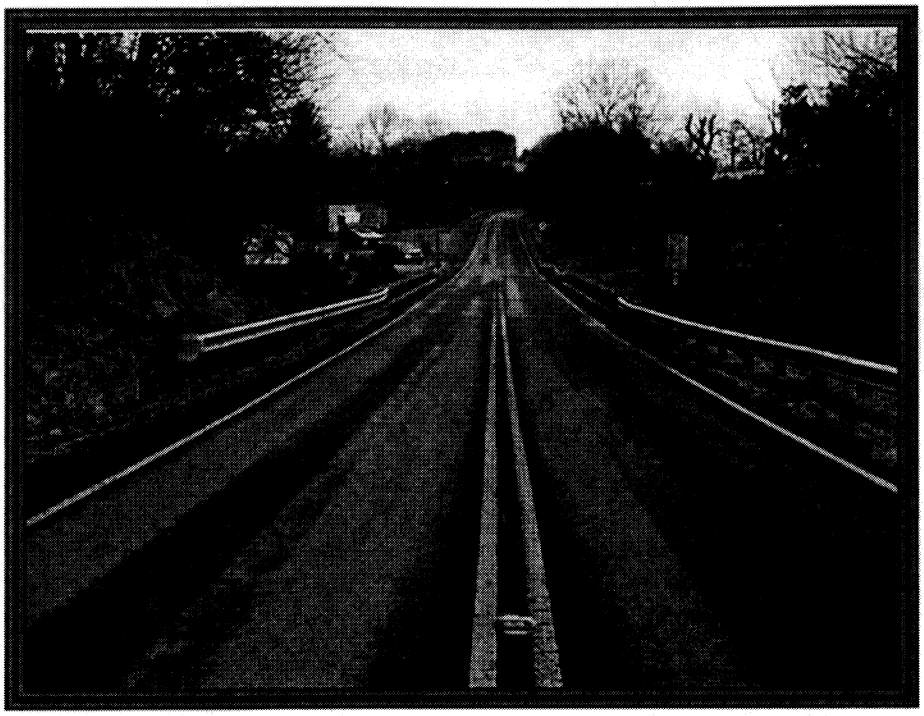
Alternative 1 – replaces bridge on the existing alignment. An "off-site" detour will be used to maintain traffic during the construction period.

Alternative 2 - replaces bridge on the existing alignment. An "on-site" detour will be used to maintain traffic during the construction period.

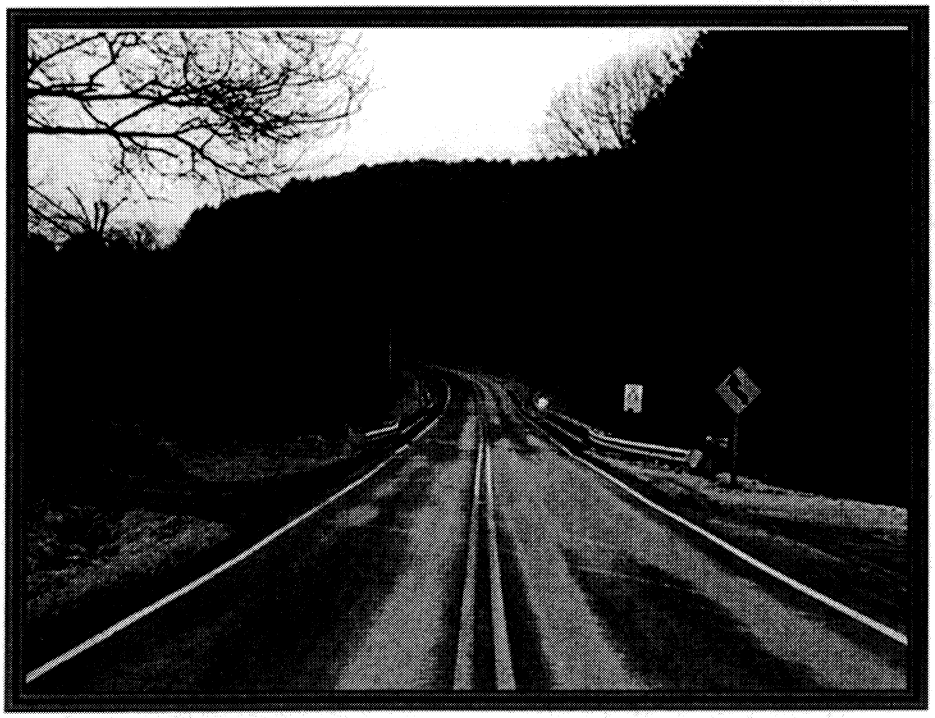
Alternative 3 - replaces bridge on new alignment approximately 50 feet west of Bridge No. 38. Traffic will be maintained on the existing bridges during construction.


VA.
N.C.
Edmonds
VA.
N.C.
CUMBERLAND KNOB
PARKWAY
Crab Creek Bapt. Ch.
Blevins Cross Roads
Little Pine Church
Barrett
Ennice
Hooker
Little Blue Ridge Church
Glade Creek Church
Glade Creek School
Hare
Rich Hill
SADDLE MTN.
BLUE RIDGE
PARKWAY
Little Glade Creek
COUNTY LINE
Brush Creek
Pine Creek
Creek
1 0 1 2 MILES
SCALE
21
221
ALLEGHANY CO.
221
21
North Carolina Department of Transportation
Project Development and
Environmental Analysis Branch
ALLEGHANY COUNTY
BRIDGE No. 38 ON NC 18
Crab Creek
T.I.P. No. B-4007
FIGURE 1

ALLEGHANY COUNTY
BRIDGE No. 38
B-4007



Looking North



Looking South

NCDOT Welcomes Citizen Input

Public Involvement is an important part of the planning process. The North Carolina Department of Transportation is committed to ensuring all issues of concern to the public are addressed and considered before any recommendations or decisions are made. Your opinions are important to us! Please send your comments to the addresses listed below:

Mr. Elmo Vance
Project Development & Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, NC 27699-1548
(919) 733-3141 Ext. 262
eevance@dot.state.nc.us

or

Mr. J. T. Peacock, Jr., P.E.
or Ms. Kimberly S. Leight
Rummel, Klepper & Kahl, LLP
5800 Faringdon Place, Suite 105
Raleigh, NC 27609-3960
(888) 521-4455
kleight@rkkengineers.com

If you have questions on other transportation projects, please call our Customer Service Office toll free at 1-877-DOT-4YOU or check our website at www.dot.state.nc.us.

Mr. Elmo Vance
North Carolina Department of Transportation
Project Development & Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

ADDRESS CORRECTION REQUESTED

PROJECT REFERENCE NO.	SHEET NO.
B-4007	2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

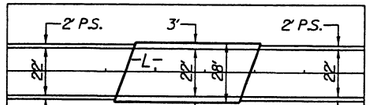
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SCALES
50 25 0 50 100

English

REVISIONS 5/17/02

NOTE: ALL DETOUR GUARDRAIL WILL BE TEMPORARY.



DETAIL FOR BRIDGE AND APPROACHES
NOT TO SCALE

PLACE 6" DECK DRAINS ON 12' CENTERS:
STA -L- 17+78 TO 17+90 LT
STA -L- 17+58 TO 17+70 RT

NC GRID NAD '83

-L- 18+88.57 147.09' LT
-T- 101 5+00 POT
ELEV = 2407.64
NAIL SET

-L- 18+32.28 18.64' LT
-BL- 5 13+75.01 PINC
-T- 102 6+40.24 PINC
ELEV = 2423.74
REBAR & CAP SET

-BL-GPS 4007-1 9+15.88 PINC=
-L- Sta. 13+72.31 (19.56'LT.)

-BL-4 Sta.7+54.01 PINC=
-L- Sta. 12+13.78 (18.27'LT)

TEMPORARY CONSTRUCTION EASEMENT FOR TEMPORARY ACCESS ROAD. LOCATION TO BE DETERMINED BY RESIDENT ENGINEER.

-BL-GPS 4007-2 18+39.13 PINC

REMOVE & STOCKPILE EXISTING GUARDRAIL

PLUG & FILL BOTH ENDS EXIST. 18"CSP & REMOVE EXIST. HW AFTER DETOUR REMOVAL

TEMP. TOE PROTECTION SEE DETAIL 'D'

TEMP. 18" CSP W/2.0 TONS CL B RIPRAP & BRIDGE #38 W/7.0 S.Y. FILTER FABRIC

TEMP. 18" CSP W/2.0 TONS CL B RIPRAP & W/7.0 S.Y. FILTER FABRIC

TEMP. GRADE TO DRAIN

PLUG & FILL REMOVE

-DETOUR-

TEMP. 2.0 TONS CL B RIPRAP W/7.0 S.Y. FILTER FABRIC MOVE TO 24"CSP OUTLET AFTER 18" CSP REMOVAL

TEMP. 18" CSP W/2 ELBOWS REMOVE AFTER DETOUR REMOVAL

TEMP. 12" FUNNEL DRAIN PIPE W/2 ELBOWS

LATERAL BASE DITCH SEE DETAIL 'B'

NOTE: DI #10 AND DI #11 WILL BE TEMPORARILY BURIED UNTIL AFTER DETOUR IS REMOVED.

-L- 15+88.94 115.28' RT
-T- 103 9+17.99 POT
ELEV = 2411.36
NAIL SET

-BL-3 5+00.00 POT

DENOTES TEMPORARY FILL IN WETLANDS

DENOTES MECHANIZED CLEARING

DB 101 PG 438 TRACT 9

DB 198 PG 600

DB 69 PG 619

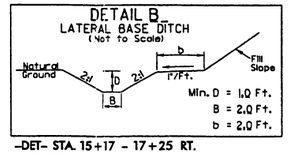
DB 60 PG 281
DB 60 PG 223
TEMP. DB 29 PG 490

DB 207 PG 741
PB 9 PG 92

DB 64 PC 233

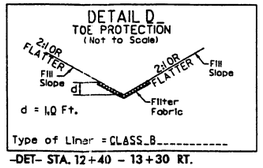
WOODS
GRASS
GRAVEL
CRAB CREEK
OBSCURED
DILAPIDATED FENCE
CHRISTMAS TREES
ISFD
ISBLK G
L5 BLKD
ROCK SPRING
DOG HOUSE
3 RAIL WOOD
POST
TO SPARTA
EXISTING R/W
CONC HW
MTL
PDE
FDE
18" CMP
48" CMP
N.C.19 20.5' RST
36"NW W/35BW
48"NW W/45SW
55BW

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



-DET- STA. 15+17 - 17+25 RT.

DETAIL D
TOE PROTECTION
(Not to Scale)



-DET- STA. 12+40 - 13+30 RT.

SEE SHEETS S- THRU S- FOR STRUCTURE PLANS

SEE SHEET 5 FOR -DET- PROFILE

PLANS PREPARED BY :
RUMMEL KLEPPER & KAHL, LLP
consulting engineers
5800 FARINGDON PLACE SUITE 105
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

12/22/2004
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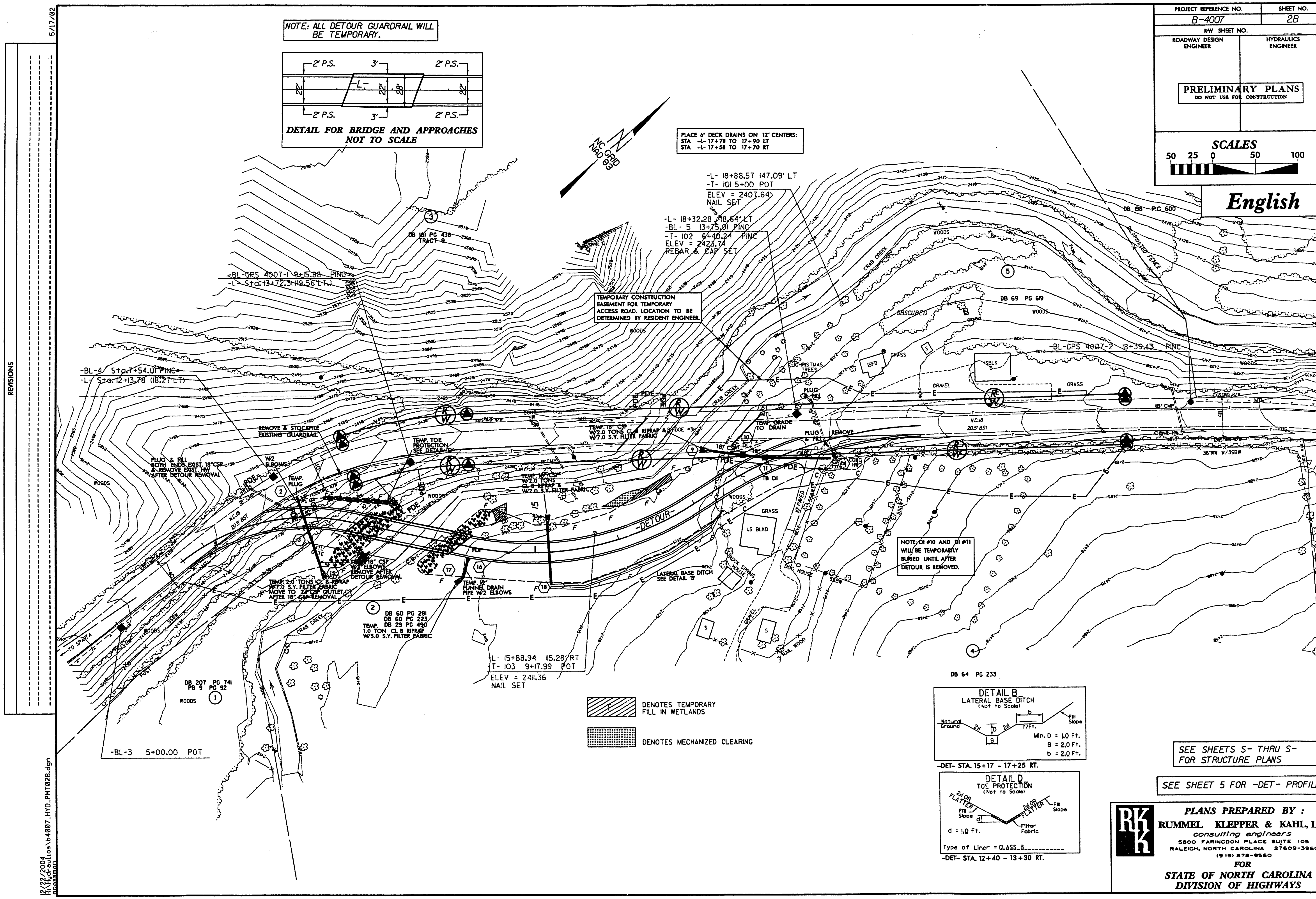
aprossmo


5/17/02
REVISIONS
PROJECT REFERENCE NO. B-4007
SHEET NO. 2B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SCALES
50 25 0 50 100
English
NOTE: ALL DETOUR GUARDRAIL WILL BE TEMPORARY.
DETAIL FOR BRIDGE AND APPROACHES
NOT TO SCALE
2' P.S.
3'
-L-
NC GRID NAD 83
PLACE 6" DECK DRAINS ON 12' CENTERS:
STA -L- 17+78 TO 17+90 LT
STA -L- 17+58 TO 17+70 RT
-L- 18+88.57 147.09' LT
-T- 101 5+00 POT
ELEV = 2407.64
NAIL SET
-L- 18+32.28 18.64' LT
-BL- 5 13+75.81 PINC
-T- 102 6+40.24 PINC
ELEV = 2423.74
REBAR & CAP SET
-BL-GPS 4007-1 9+15.88 PINC
-L- Sta.13+72.31(19.56'LT.)
DB 101 PG 438
TRACT 9
TEMPORARY CONSTRUCTION EASEMENT FOR TEMPORARY ACCESS ROAD. LOCATION TO BE DETERMINED BY RESIDENT ENGINEER.
DB 198 PG 600
DB 69 PG 619
-BL-GPS 4007-2 18+39.13 PINC
-BL-4 Sta.7+54.01 PINC
-L- Sta.12+13.78 (18.27'LT)
REMOVE & STOCKPILE EXISTING GUARDRAIL
PLUG & FILL BOTH ENDS EXIST. 18" CSP & REMOVE EXIST. HW AFTER DETOUR REMOVAL
W2 ELBOWS
TEMP. PLUG
TEMP. TOE PROTECTION SEE DETAIL 'D'
TEMP. 18" CSP W/2.0 TONS CL B RIPRAP & W/7.0 S.Y. FILTER FABRIC
TEMP. GRADE TO DRAIN
PLUG & FILL
REMOVE
CRAB CREEK
-DETOUR-
N.C.18 20.5' BST
NOTE: DI #10 AND DI #11 WILL BE TEMPORARILY BURIED UNTIL AFTER DETOUR IS REMOVED.
TEMP. 2.0 TONS CL B RIPRAP W/7.0 S.Y. FILTER FABRIC MOVE TO 28" CSP OUTLET AFTER 18" CSP REMOVAL
18" CSP W/2 ELBOWS REMOVE AFTER DETOUR REMOVAL
TEMP. 12" FUNNEL DRAIN PIPE W/2 ELBOWS
LATERAL BASE DITCH SEE DETAIL 'B'
DB 60 PG 281
DB 60 PG 223
DB 29 PG 490
TEMP. 1.0 TON CL B RIPRAP W/5.0 S.Y. FILTER FABRIC
-L- 15+88.94 115.28' RT
-T- 103 9+17.99 POT
ELEV = 2411.36
NAIL SET
DB 207 PG 741
PB 9 PG 92
DB 64 PG 233
-BL-3 5+00.00 POT
TO SPARTA
DENOTES TEMPORARY FILL IN WETLANDS
DENOTES MECHANIZED CLEARING
DETAIL B
LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Fill Slope
Min. D = 1.0 Ft.
B = 2.0 Ft.
b = 2.0 Ft.
-DET- STA. 15+17 - 17+25 RT.
DETAIL D
TOE PROTECTION
(Not to Scale)
2:1 OR FLATTER
Fill Slope
Filter Fabric
d = 1.0 Ft.
Type of Liner = CLASS B
-DET- STA. 12+40 - 13+30 RT.
SEE SHEETS S- THRU S- FOR STRUCTURE PLANS
SEE SHEET 5 FOR -DET- PROFILE
PLANS PREPARED BY :
RUMMEL KLEPPER & KAHL, LLP
consulting engineers
5800 FARINGDON PLACE SUITE 105
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
12/22/2004
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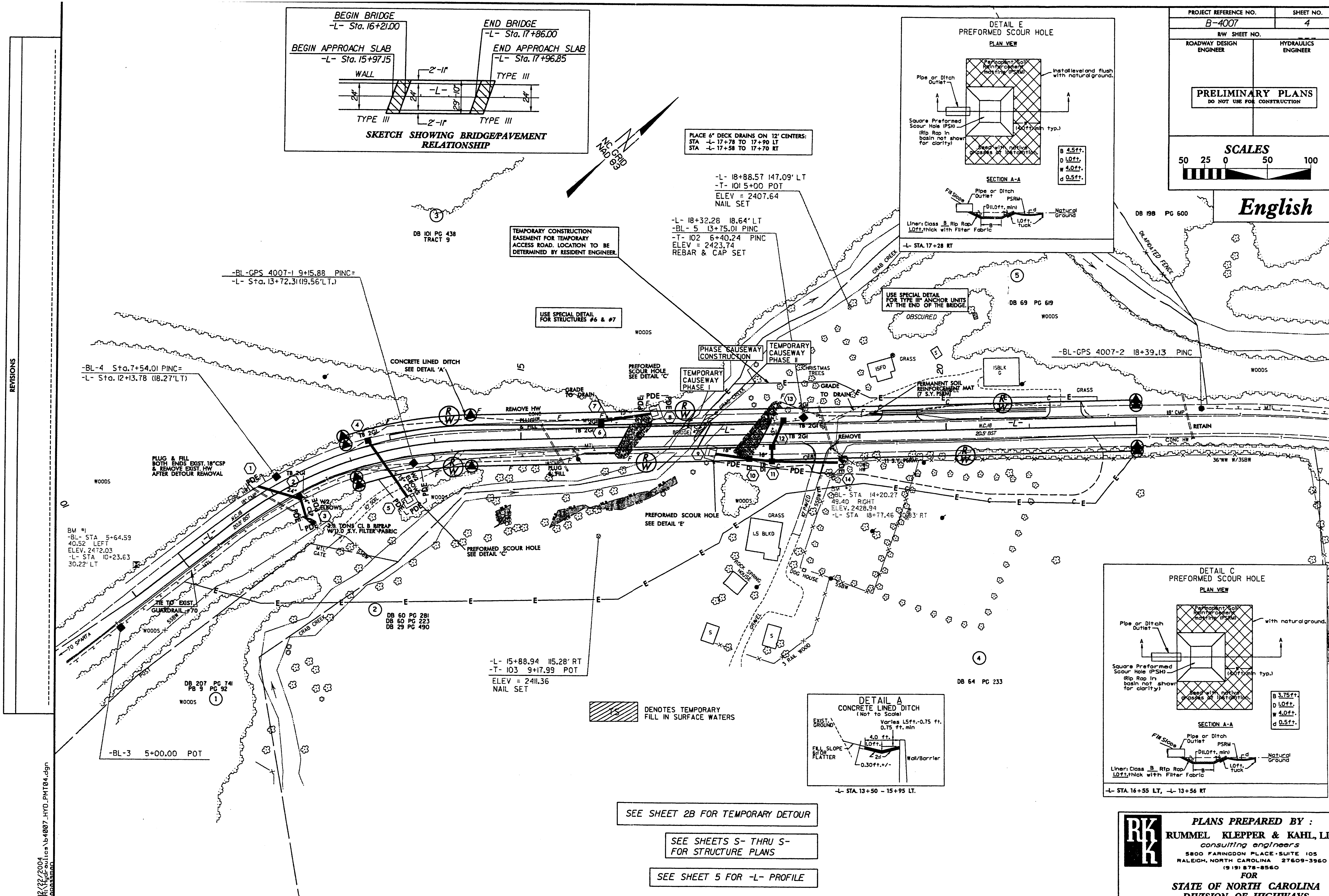
BEGIN BRIDGE
-L- Sta. 16+21.00
END BRIDGE
-L- Sta. 17+86.00
BEGIN APPROACH SLAB
-L- Sta. 15+97.15
END APPROACH SLAB
-L- Sta. 17+96.85
WALL
TYPE III
SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP
NC GRID NAD 83
PLACE 6" DECK DRAINS ON 12' CENTERS:
STA -L- 17+78 TO 17+90 LT
STA -L- 17+58 TO 17+70 RT
DETAIL E
PREFORMED SCOUR HOLE
PLAN VIEW
SECTION A-A
-L- STA. 17+28 RT
-L- 18+88.57 147.09' LT
-T- 101 5+00 POT
ELEV = 2407.64
NAIL SET
-L- 18+32.28 18.64' LT
-BL- 5 13+75.01 PINC
-T- 102 6+40.24 PINC
ELEV = 2423.74
REBAR & CAP SET
TEMPORARY CONSTRUCTION EASEMENT FOR TEMPORARY ACCESS ROAD. LOCATION TO BE DETERMINED BY RESIDENT ENGINEER.
DB 101 PG 438
TRACT 9
-BL-GPS 4007-1 9+15.88 PINC=
-L- Sta. 13+72.31(19.56'LT.)
USE SPECIAL DETAIL FOR STRUCTURES #6 & #7
USE SPECIAL DETAIL FOR TYPE III ANCHOR UNITS AT THE END OF THE BRIDGE.
DB 198 PG 600
DB 69 PG 619
-BL-GPS 4007-2 18+39.13 PINC
-BL-4 Sta.7+54.01 PINC=
-L- Sta. 12+13.78 (18.27'LT)
CONCRETE LINED DITCH
SEE DETAIL 'A'
PHASE CAUSEWAY CONSTRUCTION
TEMPORARY CAUSEWAY PHASE II
TEMPORARY CAUSEWAY PHASE I
PREFORMED SCOUR HOLE
SEE DETAIL 'C'
PERMANENT SOIL REINFORCEMENT MAT (7 S.Y. PSRM)
PLUG & FILL BOTH ENDS EXIST. 18"CSP & REMOVE EXIST. HW AFTER DETOUR REMOVAL
BM #1
-BL- STA 5+64.59
40.52 LEFT
ELEV. 2472.03
-L- STA 10+23.63
30.22' LT
BM #2
-BL- STA 14+20.27
49.40 RIGHT
ELEV. 2428.94
-L- STA 18+77.46
PREFORMED SCOUR HOLE
SEE DETAIL 'E'
TIE TO EXIST. GUARDRAIL
TO SPARTA
DB 60 PG 281
DB 60 PG 223
DB 29 PG 490
DB 207 PG 741
PB 9 PG 92
DB 64 PG 233
-L- 15+88.94 115.28' RT
-T- 103 9+17.99 POT
ELEV = 2411.36
NAIL SET
-BL-3 5+00.00 POT
DENOTES TEMPORARY FILL IN SURFACE WATERS
DETAIL A
CONCRETE LINED DITCH
(Not to Scale)
-L- STA. 13+50 - 15+95 LT.
DETAIL C
PREFORMED SCOUR HOLE
PLAN VIEW
SECTION A-A
-L- STA. 16+55 LT, -L- 13+56 RT
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4007	4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SCALES
50 25 0 50 100

English

SEE SHEET 2B FOR TEMPORARY DETOUR

SEE SHEETS S- THRU S- FOR STRUCTURE PLANS

SEE SHEET 5 FOR -L- PROFILE

PLANS PREPARED BY :
RUMMEL KLEPPER & KAHL, LLP
consulting engineers
5800 FARINGDON PLACE-SUITE 105
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-8560
FOR
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

12/22/2004
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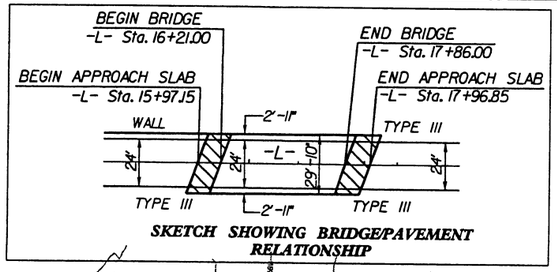
PROJECT REFERENCE NO.	SHEET NO.
B-4007	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SCALES
50 25 0 50 100

English

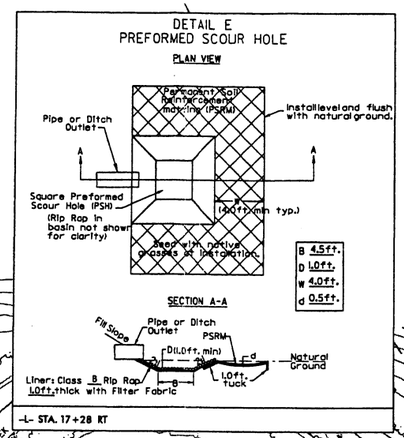
REVISIONS



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP

NC GRID NAD 83

PLACE 6" DECK DRAINS ON 12' CENTERS:
STA -L- 17+78 TO 17+90 LT
STA -L- 17+58 TO 17+70 RT



DENOTES TEMPORARY FILL IN SURFACE WATERS

SEE SHEET 2B FOR TEMPORARY DETOUR

SEE SHEETS S- THRU S- FOR STRUCTURE PLANS

SEE SHEET 5 FOR -L- PROFILE

PLANS PREPARED BY :
RUMMEL KLEPPER & KAHL, LLP
consulting engineers
5800 FARINGDON PLACE-SUITE 105
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-8560
FOR
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

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PROJECT REFERENCE NO.	SHEET NO.
B-4007	5

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

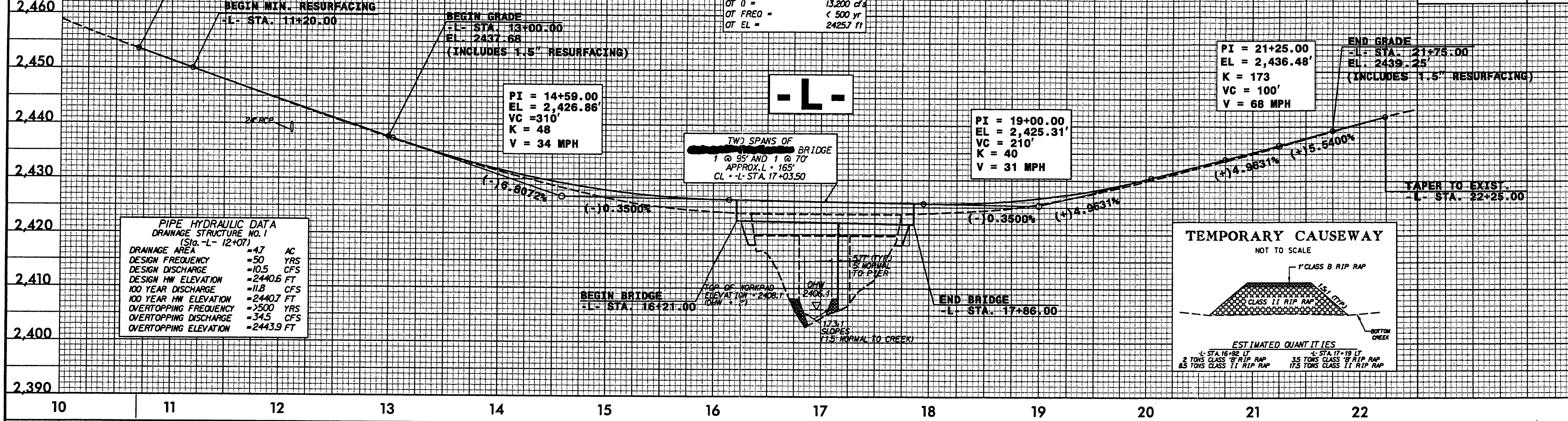
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM #1 8" spike in base of 10" twin white oak Sta.5+64.59 -BL- 40.52' offset Lt.= Sta.10+23.63 -L- 30.22' offset Lt. Elev.2,472.03

BM #2 8" spike in base of 18" oak Sta.14+20.27 -BL- 49.40' offset Rt.= Sta.18+77.46 -L- 30.83' offset Rt. Elev.2,428.94

BRIDGE DATA
BRIDGE #38
OVER CRAB CREEK

DESIGN Q =	2,800 cfs
DESIGN FREQ =	50 yr
DESIGN EL =	2414.3 ft
BASE FLOOD Q =	3,400 cfs
BASE FLOOD FREQ =	100 yr
BASE FLOOD EL =	2415.0 ft
OT Q =	13,200 cfs
OT FREQ =	< 500 yr
OT EL =	2425.7 ft



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1
(Sta. -L- 12+07)

DRAINAGE AREA	=4.7	AC
DESIGN FREQUENCY	=50	YRS
DESIGN DISCHARGE	=10.5	CFS
DESIGN HW ELEVATION	=2440.6	FT
100 YEAR DISCHARGE	=11.8	CFS
100 YEAR HW ELEVATION	=2440.7	FT
OVERTOPPING FREQUENCY	=>500	YRS
OVERTOPPING DISCHARGE	=34.5	CFS
OVERTOPPING ELEVATION	=2443.9	FT

TEMPORARY CAUSEWAY
NOT TO SCALE

1' CLASS B RIP RAP
1.5:1 (TYP.)
CLASS II RIP RAP
BOTTOM CREEK

ESTIMATED QUANTITIES

-L- STA.16+92 LT	-L- STA.17+19 LT
2 TONS CLASS 'B' RIP RAP	35 TONS CLASS 'B' RIP RAP
85 TONS CLASS II RIP RAP	175 TONS CLASS II RIP RAP

DETOUR BRIDGE DATA
BRIDGE #38
OVER CRAB CREEK

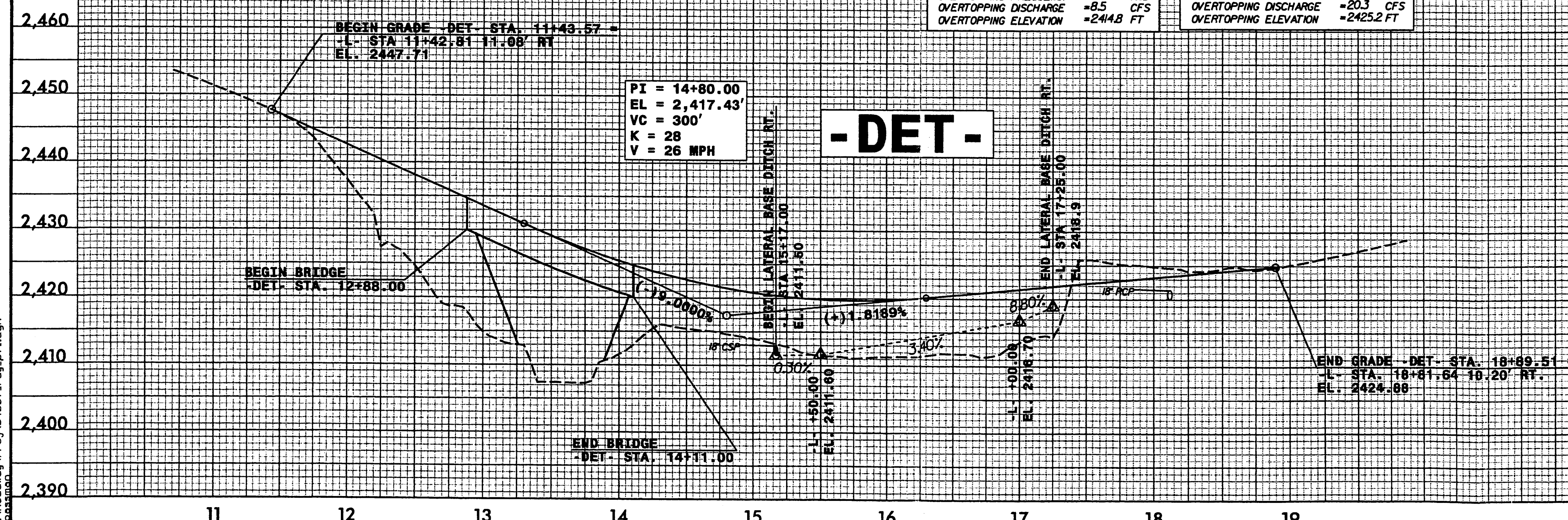
DESIGN Q =	1,200 cfs
DESIGN FREQ =	5 yr
DESIGN EL =	2415.2 ft

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.10
(Sta. -DET- 15+17)

DRAINAGE AREA	=2.0	AC
DESIGN FREQUENCY	=50	YRS
DESIGN DISCHARGE	=4.5	CFS
DESIGN HW ELEVATION	=2413.1	FT
100 YEAR DISCHARGE	=5.1	CFS
100 YEAR HW ELEVATION	=2413.2	FT
OVERTOPPING FREQUENCY	=>500	YRS
OVERTOPPING DISCHARGE	=8.5	CFS
OVERTOPPING ELEVATION	=2414.8	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.9
(Sta. -DET- 18+12)

DRAINAGE AREA	=2.8	AC
DESIGN FREQUENCY	=50	YRS
DESIGN DISCHARGE	=8.5	CFS
DESIGN HW ELEVATION	=2421.8	FT
100 YEAR DISCHARGE	=9.5	CFS
100 YEAR HW ELEVATION	=2421.9	FT
OVERTOPPING FREQUENCY	=>500	YRS
OVERTOPPING DISCHARGE	=20.3	CFS
OVERTOPPING ELEVATION	=2425.2	FT



PLANS PREPARED BY :

RUMMEL • KLEPPER & KAHL, LLP
consulting engineers
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(919) 878-9560

FOR

DIVISION OF HIGHWAYS

12/22/2004
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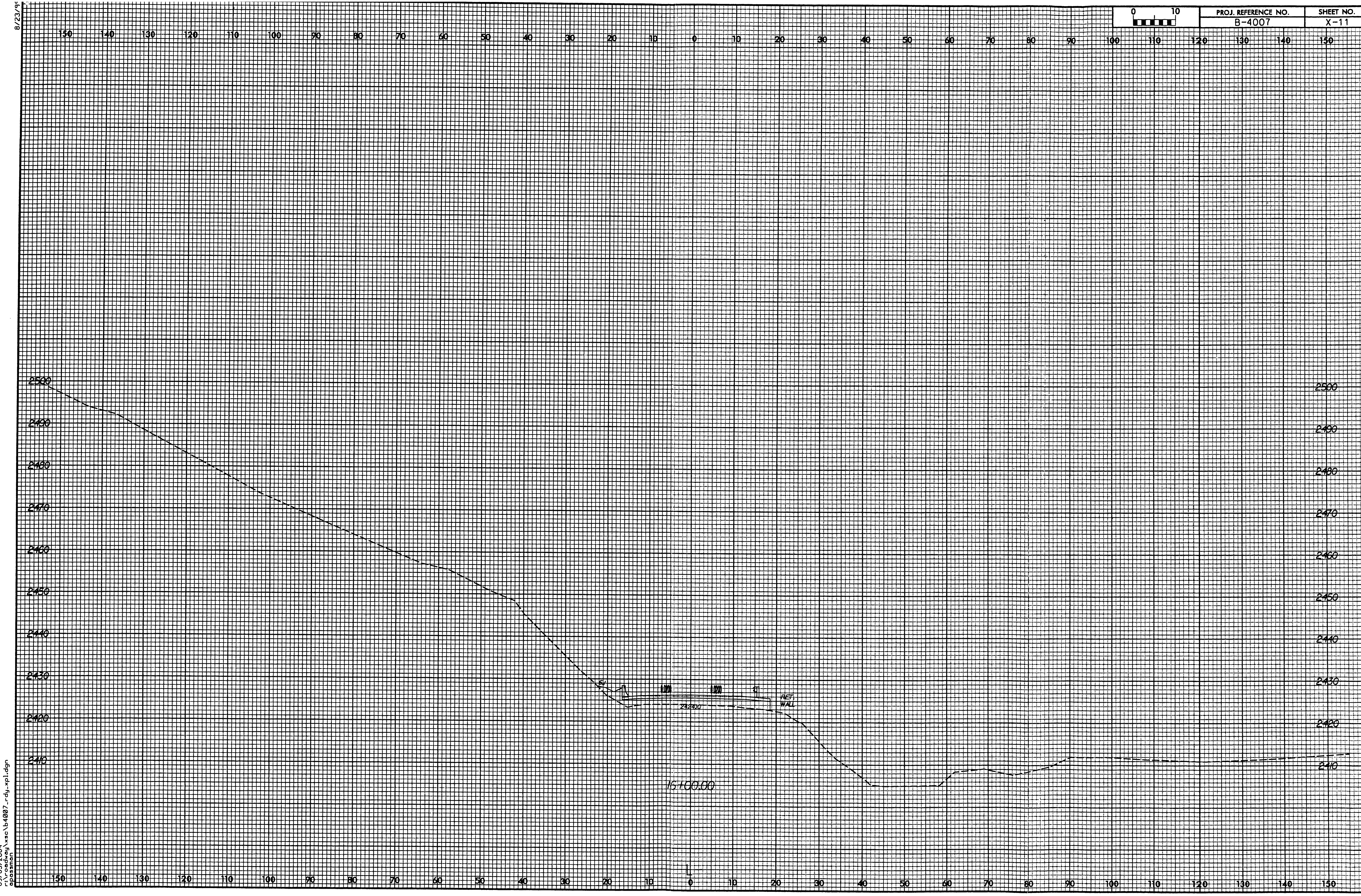
5/28/99

PROJ. REFERENCE NO.	SHEET NO.
B-4007	X-11



09/03/2004
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apassman

8/23/

PROJ. REFERENCE NO.	SHEET NO.
B-4007	X-12

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

2430
2420
2410
2450
2440
2430
2420
2410
2470
2460
2450
2440
2430
2420
2410

2411.52

17+50.00

2416.36

16+50.00

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

09/03/2004
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passman

PROPERTY NO.	PROPERTY OWNER NAME	PROP. OWNER MAILING ADDRESS
1	JOSE VARELA, TERESA FERNANDEZ	9735 SW 73rd Street, Miami, FL 33165
2	ROGER WILSON	P.O. Box 203, Hillsville, VA 24342
3	BILLY SMITH FARMS INC.	39 Enola Way, Ennice, NC 28623
4	EUGENE E. EDWARDS, SHIRLEY H. EDWARDS	8882 NC Hwy 18 N, Ennice, NC 28623
5	EUGENE EDWARDS, SHIRLEY EDWARDS	8882 NC Hwy 18 N, Ennice, NC 28623

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
ALLEGHANY COUNTY

PROJECT 33375.1.1 (B-4007)

BRIDGE NO. 38 AND APPROACHES
ON NC 18 OVER CRAB CREEK

SHEET 4 OF

12/13/04

R:\HYDRAULICS\B4007_HYD_PROP_PWT

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS				
			Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
1	16+92 -L- Lt	Temp Causeway (Phase I)							0.002		
2	17+19 -L- Lt	Temp Causeway (Phase II)							0.005		
3	14+53 -DET- Lt			0.004		0.002					
4	16+24 -DET- Lt			0.009		0.008					
TOTAL			0	0.013	0	0.01	0	0	0.007		0

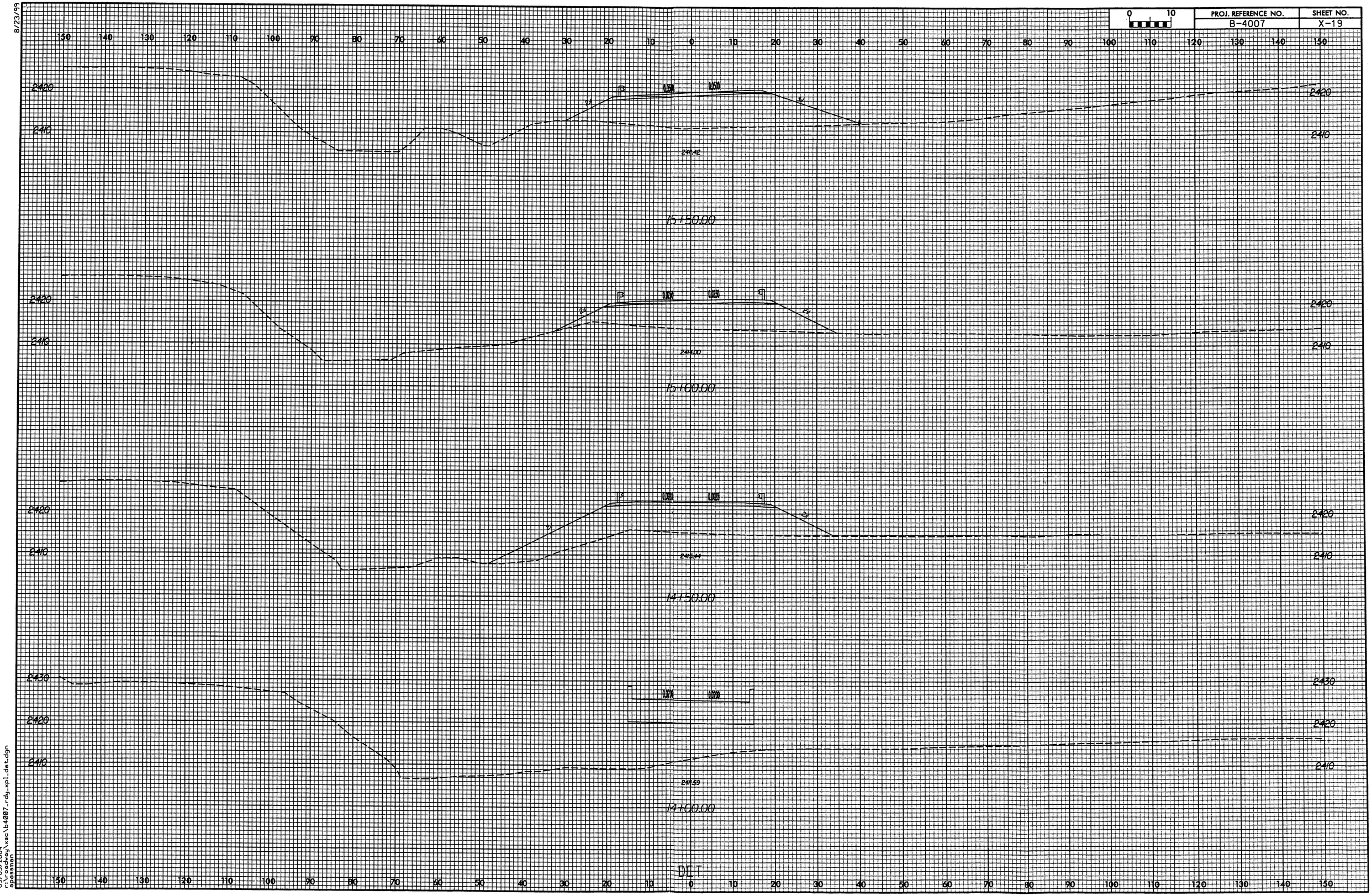
Form Revised 3/22/01

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ALLEGHANY COUNTY
PROJECT: 33375.1.1 (B-4007)
BRIDGE #38 OVER CRAB CREEK ON NC 18

SHEET OF December-04

8/23/99

0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4007	X-19



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aposman

8/23/99

0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4007	X-20

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

2440
2430
2420
2410

11+100.00

24357

2440
2430
2420
2410

13+50.00

24180

2440
2430
2420
2410

15+00.00

24129

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

DET

09/03/2004
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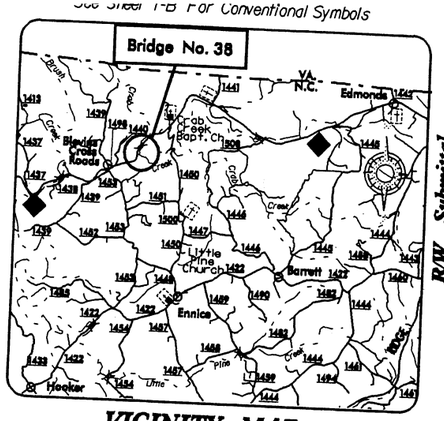
apassman

See Sheet 1-B For Conventional Symbols



VICINITY MAP

R/W Submittal

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

received
1/13/05

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4007	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33375.1.1	BRSTP-18(8)	PE	

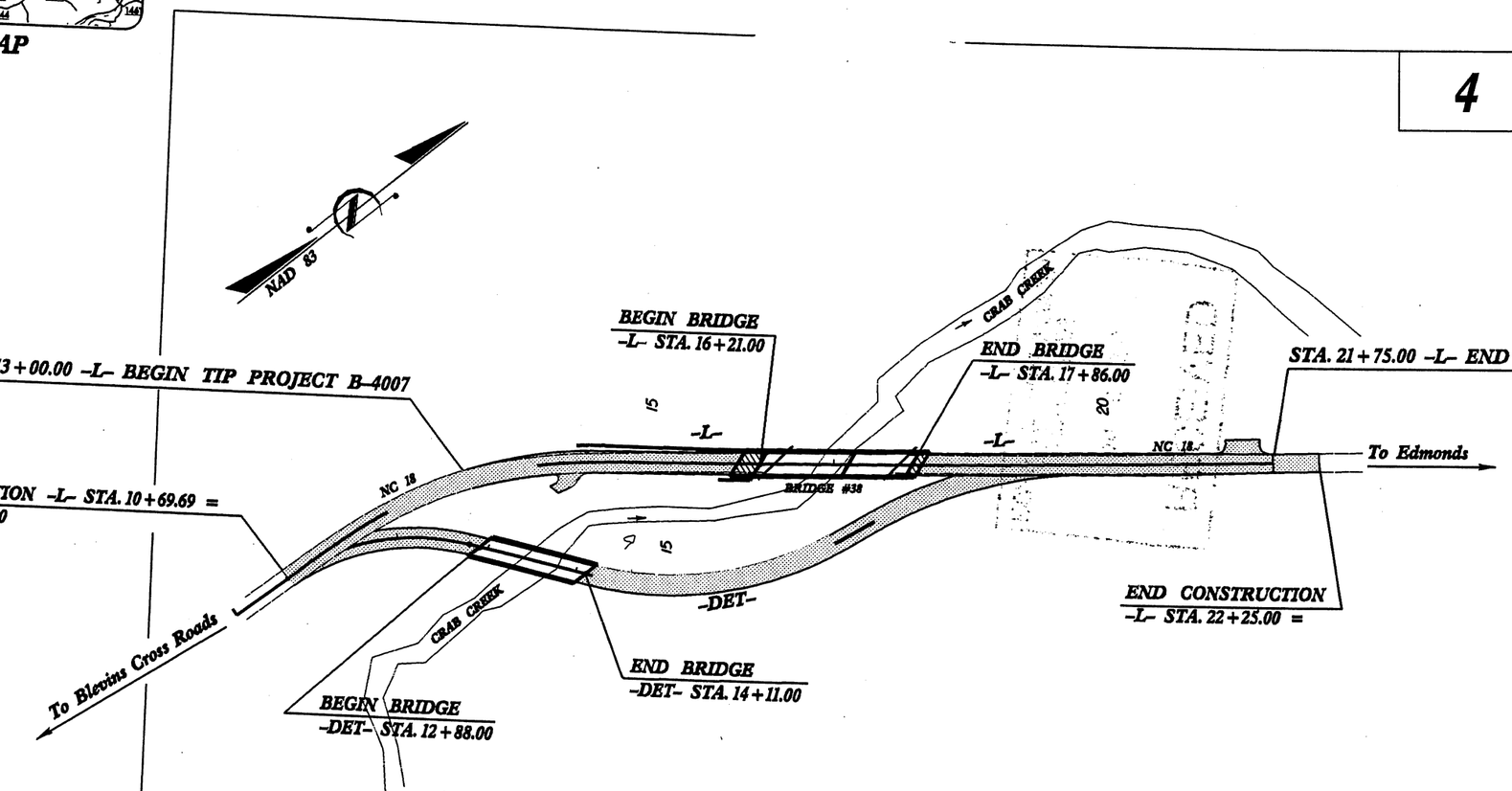
ALLEGHANY COUNTY

LOCATION: Bridge No. 38 and approaches over Crab Creek on NC 18

TYPE OF WORK: GRADING, PAVING, DRAINAGE, & STRUCTURE

CONTRACT: T.I.P. PROJECT: B-4007

4

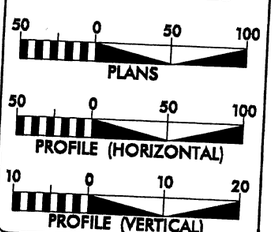


Design Exception Required for the Horizontal and Vertical Alignments.

Clearing on this project shall be performed to the limits established by method III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES



DESIGN DATA

ADT 2005= 1,800
ADT 2025= 2,800
DHV= 15 %
D = 60 %
T = 5 % *
V = 60 MPH
* TTST 2% DUAL 3%

RURAL MAJOR COLLECTOR

PROJECT LENGTH

Length Roadway T.I.P. Project B-4007 ..... 0.178 mi

Length Structure T.I.P. Project B-4007 ..... 0.031 mi

Total Length T.I.P. Project B-4007 ..... 0.209 mi

PLANS PREPARED BY:
RUMMEL KLEPPER & KAHL, LLP
consulting engineers
5800 FAIRWOOD PLACE SUITE 105
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR DIVISION OF HIGHWAYS

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: December 17, 2004

LETTING DATE: February 21, 2006

Michael T. Merritt, P.E.
PROJECT ENGINEER

Ana M. Passman, P.E.
PROJECT DESIGN ENGINEER

NCDOT CONTACT: Teresa M. Bruton, P.E.
PROJECT ENGINEER-PROJECT SERVICES

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

04-JAN-2005 09:35
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kyroland

PROJECT REFERENCE NO.	SHEET NO.
B-4007	1-B

*S.U.E = SUBSURFACE UTILITY ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

ROADS & RELATED ITEMS

Edge of Pavement
Curb
Prop. Slope Stakes Cut — C
Prop. Slope Stakes Fill — F
Prop. Woven Wire Fence
Prop. Chain Link Fence
Prop. Barbed Wire Fence
Prop. Wheelchair Ramp
Curb Cut for Future Wheelchair Ramp — WCR / CCFR
Exist. Guardrail
Prop. Guardrail
Equality Symbol
Pavement Removal

RIGHT OF WAY

Baseline Control Point
Existing Right of Way Marker
Exist. Right of Way Line w/Marker
Prop. Right of Way Line with Proposed R/W Marker (Iron Pin & Cap)
Prop. Right of Way Line with Proposed (Concrete or Granite) R/W Marker
Exist. Control of Access Line — CA
Prop. Control of Access Line — CA
Exist. Easement Line — E
Prop. Temp. Construction Easement Line — E
Prop. Temp. Drainage Easement Line — TDE
Prop. Perm. Drainage Easement Line — PDE

HYDROLOGY

Stream or Body of Water
River Basin Buffer — RB
Flow Arrow
Disappearing Stream
Spring
Swamp Marsh
Shoreline
Falls, Rapids
Prop Lateral, Tail, Head Ditches — FLOW

STRUCTURES

MAJOR
Bridge, Tunnel, or Box Culvert — CONC
Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR
Head & End Wall — CONC HW
Pipe Culvert
Footbridge
Drainage Boxes
Paved Ditch Gutter — CB

UTILITIES

Exist. Pole
Exist. Power Pole
Prop. Power Pole
Exist. Telephone Pole
Prop. Telephone Pole
Exist. Joint Use Pole
Prop. Joint Use Pole
Telephone Pedestal — T
U/G Telephone Cable Hand Hold — HH
Cable TV Pedestal — C
U/G TV Cable Hand Hold — HH
U/G Power Cable Hand Hold — HH
Hydrant
Satellite Dish
Exist. Water Valve
Sewer Clean Out
Power Manhole
Telephone Booth — P
Cellular Telephone Tower
Water Manhole — W
Light Pole
H-Frame Pole
Power Line Tower
Pole with Base
Gas Valve
Gas Meter
Telephone Manhole
Power Transformer
Sanitary Sewer Manhole
Storm Sewer Manhole
Tank; Water, Gas, Oil — S
Water Tank With Legs
Traffic Signal Junction Box — S
Fiber Optic Splice Box — F
Television or Radio Tower
Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement — TS

Recorded Water Line — W
Designated Water Line (S.U.E.*) — W
Sanitary Sewer — SS
Recorded Sanitary Sewer Force Main — FSS
Designated Sanitary Sewer Force Main(S.U.E.*) — FSS
Recorded Gas Line — G
Designated Gas Line (S.U.E.*) — G
Storm Sewer — S
Recorded Power Line — P
Designated Power Line (S.U.E.*) — P
Recorded Telephone Cable — T
Designated Telephone Cable (S.U.E.*) — T
Recorded U/G Telephone Conduit — TC
Designated U/G Telephone Conduit (S.U.E.*) — TC
Unknown Utility (S.U.E.*) — ?UTL
Recorded Television Cable — TV
Designated Television Cable (S.U.E.*) — TV
Recorded Fiber Optics Cable — FO
Designated Fiber Optics Cable (S.U.E.*) — FO
Exist. Water Meter — 0
U/G Test Hole (S.U.E.*) — ATTUR
Abandoned According to U/G Record — E.O.I.
End of Information

BOUNDARIES & PROPERTIES

State Line
County Line
Township Line
City Line
Reservation Line
Property Line
Property Line Symbol — PL
Exist. Iron Pin — EIP
Property Corner
Property Monument — ECM
Property Number — 123
Parcel Number — 6
Fence Line — WW & ISBW
Existing Wetland Boundaries — WLB
High Quality Wetland Boundary — HQ WLB
Medium Quality Wetland Boundaries — MQ WLB
Low Quality Wetland Boundaries — LQ WLB
Proposed Wetland Boundaries — WLB
Existing Endangered Animal Boundaries — EAB
Existing Endangered Plant Boundaries — EPB

BUILDINGS & OTHER CULTURE

Buildings
Foundations
Area Outline
Gate
Gas Pump Vent or U/G Tank Cap
Church
School
Park
Cemetery
Dam
Sign
Well — W
Small Mine
Swimming Pool

TOPOGRAPHY

Loose Surface
Hard Surface
Change in Road Surface
Curb
Right of Way Symbol — R/W
Guard Post — GP
Paved Walk
Bridge
Box Culvert or Tunnel
Ferry
Culvert
Footbridge
Trail, Footpath
Light House

VEGETATION

Single Tree
Single Shrub
Hedge
Woods Line
Orchard
Vineyard — VINEYARD

RAILROADS

Standard Gauge — CSX TRANSPORTATION
RR Signal Milepost — MILEPOST 35
Switch — SWITCH

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kwalpool

revised 02/02/00

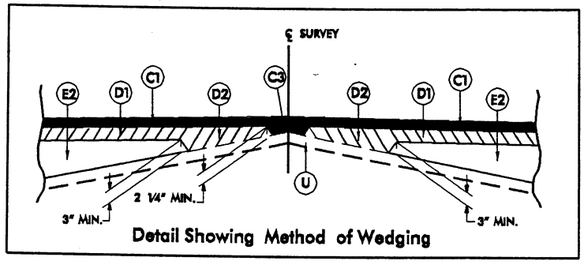
PROJECT REFERENCE NO.	SHEET NO.
B-4007	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

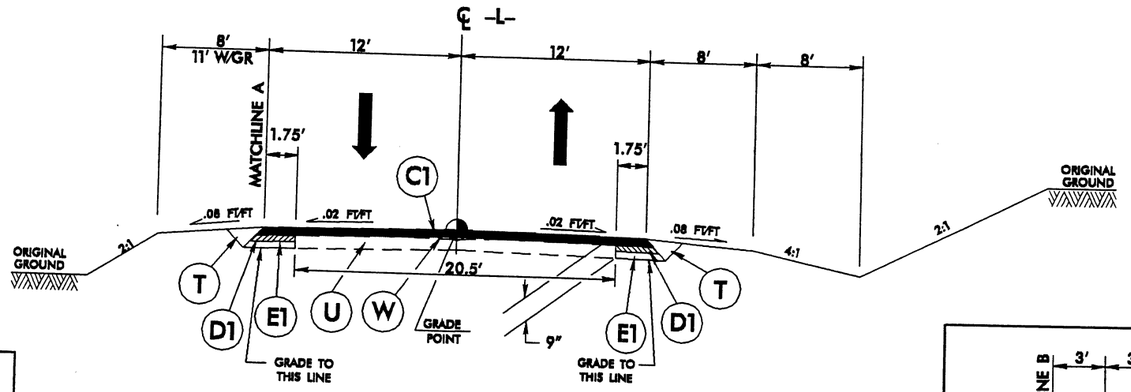
PAVEMENT SCHEDULE

ITEM	DESCRIPTION	ITEM	DESCRIPTION
C1	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 275 LBS. PER SQ. YD.	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 5.5" IN DEPTH OR LESS THAN 3" IN DEPTH.
C2	PROP. APPROX.2.0" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. IN EACH OF TWO LAYERS	J1	PROP. 8" AGGREGATE BASE COURSE
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.	R	REINFORCED CONCRETE BARRIER - SINGLE-FACED
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE BASE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	T	EARTH MATERIAL
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 4" IN DEPTH OR LESS THAN 2 1/4" IN DEPTH.	U	EXISTING PAVEMENT
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	W	WEDGING (SEE DETAIL ON THIS SHEET)

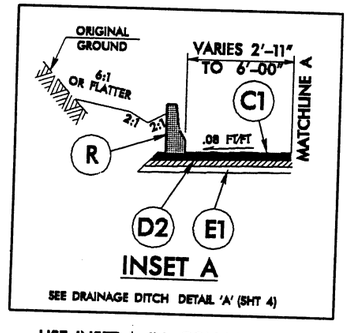
NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



Detail Showing Method of Wedging



ROADWAY TYPICAL SECTION No. 1

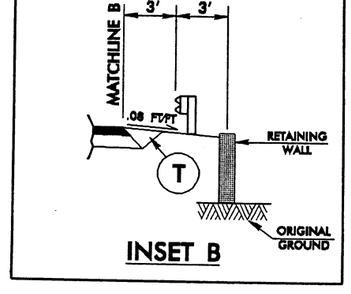


INSET A

SEE DRAINAGE DITCH DETAIL 'A' (SHT 4)

USE INSET A IN CONJUNCTION WITH TYPICAL SECTION NO. 1 & NO. 2

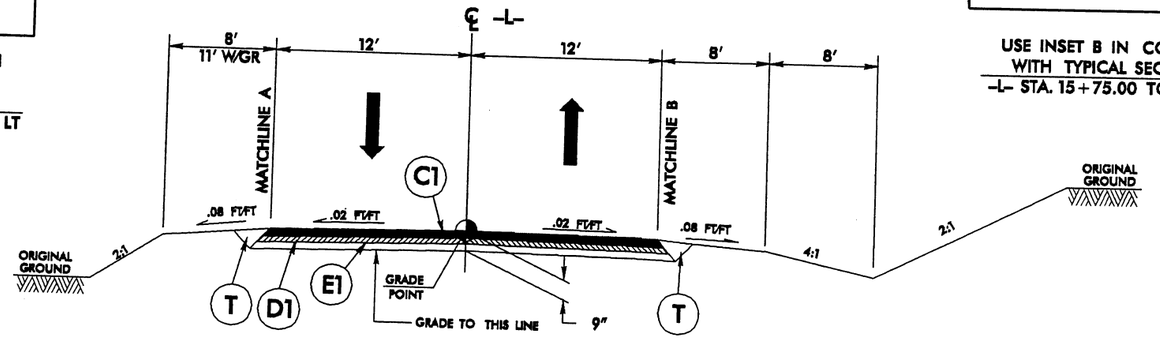
-L- STA. 14+20.00 TO 16+05.76 LT



INSET B

USE INSET B IN CONJUNCTION WITH TYPICAL SECTION NO. 2

-L- STA. 15+75.00 TO 16+10.66 RT



ROADWAY TYPICAL SECTION No. 2

TRANSITION FROM EXISTING TO TYPICAL SECTION No. 1

-L- STA. 13+00.00 TO 14+00.00

USE TYPICAL SECTION No. 1

-L- STA. 14+00.00 TO 14+61.00
-L- STA. 18+91.00 TO 20+70.00

TRANSITION FROM TYPICAL SECTION No. 1 TO EXISTING

-L- STA. 20+70.00 TO 21+75.00

USE TYPICAL SECTION No. 2

-L- STA. 14+61.00 TO 16+21.00 (Begin Bridge)
-L- STA. 17+86.00 (End Bridge) TO 18+91.00

PLANS PREPARED BY :
RUMMEL · KLEPPER & KAHL, LLP
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5800 FARINGDON PLACE · SUITE 105
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR
DIVISION OF HIGHWAYS

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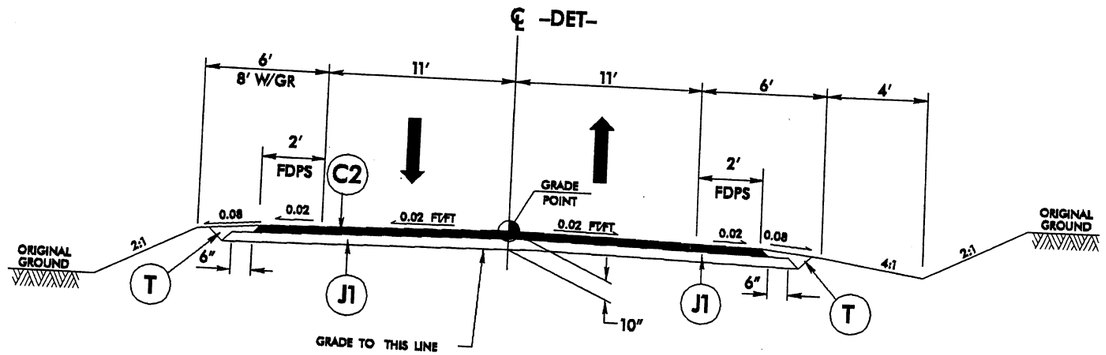
PROJECT REFERENCE NO.	SHEET NO.
B-4007	2A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAVEMENT SCHEDULE

ITEM	DESCRIPTION	ITEM	DESCRIPTION
C1	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 275 LBS. PER SQ. YD.	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 5.5" IN DEPTH OR LESS THAN 3" IN DEPTH.
C2	PROP. APPROX.2.0" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. IN EACH OF TWO LAYERS	J1	PROP. 8" AGGREGATE BASE COURSE
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.	R	REINFORCED CONCRETE BARRIER - SINGLE-FACED
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE BASE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	T	EARTH MATERIAL
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 4" IN DEPTH OR LESS THAN 2 1/4" IN DEPTH.	U	EXISTING PAVEMENT
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	W	WEDGING (SEE DETAIL ON SHEET 2)

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



TYPICAL SECTION No. 3

TRANSITION FROM EXISTING TO TYPICAL SECTION NO.3
FROM -DET- STA. 10+70.00 TO -DET- STA. 11+81.68

USE TYPICAL SECTION No. 3

-DET- STA. 11+76.48 TO 12+88.00 (Begin Bridge)
-DET- STA. 14+11.00 (End Bridge) TO 18+42.82

TRANSITION FROM TYPICAL SECTION NO.3 TO EXISTING
FROM -DET- STA. 18+42.82 TO -DET- STA. 19+87.57

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kmorford

PLANS PREPARED BY :
RUMMEL, KLEPPER & KAHL, LLP
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5800 FARINGDON PLACE, SUITE 105
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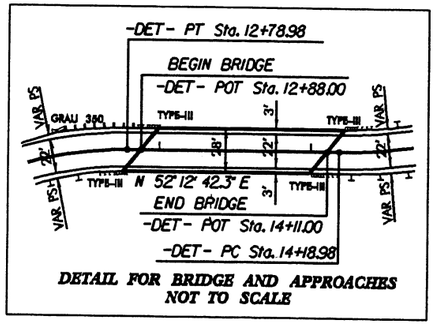
(919) 878-9560
FOR
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
B-4007	2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NOTE: ALL DETOUR GUARDRAIL WILL BE TEMPORARY.



DETAIL FOR BRIDGE AND APPROACHES
NOT TO SCALE

PLACE 6" DECK DRAINS ON 12' CENTERS:
STA -L- 17+78 TO 17+90 LT
STA -L- 17+56 TO 17+70 RT

NC GRID NAD 83

-L- 18+88.57 147.09' LT
-T- 101 5+00 POT
ELEV = 2407.64
NAIL SET

-L- 18+32.28 18.64' LT
-BL- 5 13+75.01 PINC
-T- 102 6+40.24 PINC
ELEV = 2423.74
REBAR & CAP SET

-BL-GPS 4007-1 9+15.88 PINC=
-L- Sta. 13+72.31 (19.56'LT)

TEMPORARY CONSTRUCTION EASEMENT FOR TEMPORARY ACCESS ROAD. LOCATION TO BE DETERMINED BY RESIDENT ENGINEER.

-BL-4 Sta.7+54.01 PINC=
-L- Sta. 12+13.78 (18.27'LT)

-BL-GPS 4007-2 18+39.13 PINC

-BL-3 5+00.00 POT

BILLY SMITH FARMS INC
DB 101 PG 438
TRACT 9

BILLY HAWKS
ELAINE HAWKS
DB 198 PG 600

EUGENE EDWARDS
SHIRLEY EDWARDS
DB 69 PG 619

JOSE VARELA
TERESA FERNANDEZ
DB 207 PG 74
PB 3 PG 32

(2) ROGER WILSON
DB 60 PG 228
DB 60 PG 223
DB 23 PG 490

(4) EUGENE E. EDWARDS
SHIRLEY H. EDWARDS
DB 64 PG 233

-DET- PC Sta. 14+18.98
END BRIDGE
-DET- POT Sta. 14+11.00
BEGIN BRIDGE
-DET- POT Sta. 12+88.00
-DET- PT Sta. 12+78.98
-DET- PC Sta. 10+70.00
-L- POT Sta. 10+69.69
-DET- PT Sta. 16+91.30
-DET- PC Sta. 17+41.30
-DET- POT Sta. 19+87.57
-L- POT Sta. 19+49.00

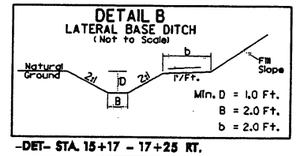
-L- 15+88.94 115.28' RT
-T- 103 9+17.99 POT
ELEV = 2411.36
NAIL SET

NOTE: DI #10 AND DI #11 WILL BE TEMPORARILY BURIED UNTIL AFTER DETOUR IS REMOVED.

-DET-

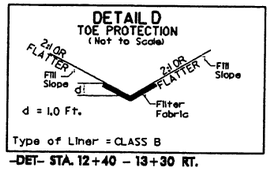
PI Sta 11+81.72	PI Sta 15+62.11	PI Sta 18+67.34
Δ = 50° 09' 21.3" (RT)	Δ = 43° 34' 14.6" (LT)	Δ = 30° 01' 33.3" (RT)
D = 24° 00' 00.0"	D = 16° 00' 00.0"	D = 12° 11' 30.0"
L = 208.98'	L = 272.32'	L = 246.28'
T = 111.72'	T = 143.12'	T = 126.04'
R = 238.73'	R = 358.10'	R = 469.96'
e = 0.07	e = 0.05	e = 0.03

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



-DET- STA. 15+17 - 17+25 RT.

DETAIL D
TOE PROTECTION
(Not to Scale)



-DET- STA. 12+40 - 13+30 RT.

SEE SHEETS S- THRU S- FOR STRUCTURE PLANS

SEE SHEET 5 FOR -DET- PROFILE

PLANS PREPARED BY :
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FOR
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

REVISIONS 5/17/10

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kvanland

PROJECT REFERENCE NO.	SHEET NO.
B-4007	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "GPS B4007-1" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 1024568.1215(ft) EASTING: 1411489.4310(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00001810
THE NC LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS B4007-1" TO -L- STATION 10+00.00 IS S 14° 01' 36.98" W Distance 361.21 ft.
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

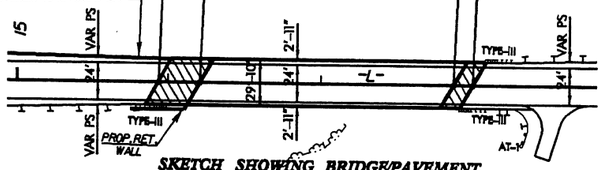
BEGIN BRIDGE
-L- POT Sta. 16+21.00

BEGIN APPROACH SLAB
-L- POT Sta. 15+97.15

END APPROACH SLAB
-L- POT Sta. 17+96.85

END BRIDGE
-L- POT Sta. 17+86.00

PROP. SINGLE-FACED CONC. BARRIER/RETAINING WALL.
-L- Sta. 14+20.00 to 16+05.76 LT.



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP

TEMPORARY CONSTRUCTION EASEMENT FOR TEMPORARY ACCESS ROAD. LOCATION TO BE DETERMINED BY RESIDENT ENGINEER.

PLACE 6" DECK DRAINS ON 12' CENTERS:
STA -L- 17+78 TO 17+90 LT
STA -L- 17+38 TO 17+70 RT

-L- 18+88.57 147.09' LT
-T- 101 5+00 POT
ELEV = 2407.64
NAIL SET

-L- 18+32.28 18.64' LT
-BL- 5 13+75.01 PINC
-T- 102 6+40.24 PINC
ELEV = 2423.74
REBAR & CAP SET

END BRIDGE
-L- POT Sta. 17+86.00

-BL-GPS 4007-1 9+15.88 PINC=
-L- Sta. 13+72.31 (19.56' LT.)

-L- PT Sta. 14+42.05

BEGIN BRIDGE
-L- POT Sta. 16+21.00

USE SPECIAL DETAIL FOR STRUCTURES #4 & #7

USE SPECIAL DETAIL FOR TYPE-III ANCHOR UNITS AT THE END OF THE BRIDGE.

BEGIN STATE PROJECT T.I.P. B-4007
-L- POT STA. 13+00.00

-BL-4 Sta. 7+54.01 PINC=
-L- Sta. 12+13.78 (18.27' LT)

BEGIN CONSTRUCTION
-L- POT Sta. 10+69.69 =
-DET- Sta. 10+70.00

-L- PC Sta. 11+35.34

PROP. SINGLE-FACED CONC. BARRIER/RETAINING WALL.
-L- Sta. 14+20.00 to 16+05.76 LT.

CONCRETE LINED DITCH SEE DETAIL 'A'

PERFORMED SCOUR HOLE SEE DETAIL 'C'

GRADE TO DRAIN

REMOVE HW

RESET EXISTING GUARDRAIL

PLUG & FILL BOTH ENDS EXIST. 18"CSP & REMOVE EXIST. HW AFTER DETOUR REMOVAL

TIE TO EXIST. GUARDRAIL +70

BM #1
-BL- STA 5+64.59
40.52 LEFT
ELEV. 2472.03
-L- STA 10+23.63
30.22' LT

-L- POT Sta. 10+00.00

-BL-3 5+00.00 POT

CLASS II RIP RAP (STRUCTURE PAY ITEM)

PREFORMED SCOUR HOLE SEE DETAIL 'C'

CLASS II PREFORMED SCOUR RIP RAP SEE DETAIL 'E' (STRUCTURE PAY ITEM)

-L- 15+88.94 115.28' RT
-T- 103 9+17.99 POT
ELEV = 2411.36
NAIL SET

-L- +52.17 (ON PL) 60.00 FT.
-L- +22.71 (ON PL) 30.00 FT.
-L- +75.00 48.00 FT. 30.00 FT.
-L- +42.00 28.00 FT. 30.00 FT.
-L- +42.05 30.00 FT.
-L- +00.00 30.00 FT ON EXIST. R/W
-L- +00.00 ON EXIST. R/W 30.00 FT.
-L- +80.00 ON R/W 29.00 FT.
-L- +42.00 ON R/W
-L- +24.00 30.00 FT. 20.00 FT.
-L- +80.00 30.00 FT. 42.00 FT.
-L- +42.05 30.00 FT.
-L- +20.00 30.00 FT.
-L- +18.00 ON R/W
-L- +08.00 51.00 FT.
-L- +34.00 55.00 FT.
-L- +78.00 75.00 FT.
-L- +55.00 20.00 FT.
-L- +10.00 93.00 FT.
-L- +10.00 190.00 FT.
-L- +70.00 60.00 FT.
-L- +10.00 40.00 FT.
-L- +80.00 35.00 FT.
-L- +25.00 30.00 FT. ON EXIST. R/W
-L- +28.00 30.00 FT. ON EXIST. R/W
-L- +75.00 90.00 FT.
-L- +50.00 85.00 FT.
-L- +00.00 60.00 FT.
-L- +75.00 30.00 FT. 30.00 FT.
-L- +10.00 70.00 FT.
-L- +35.00 115.00 FT.
-L- +30.00 126.00 FT.

PI Sta 12+94.14
Δ = 36° 36' 39.0" (RT)
D = 11° 56' 11.8"
L = 306.71'
T = 158.80'
R = 480.00'
e = 0.06
RO= See Plans

-L-

-BL-GPS 4007-2 18+39.13 PINC

CONC. EXPRESSWAY GUTTER -L- STA 19+24 TO 21+20 LT

PERMANENT SOIL REINFORCEMENT MAT 7 S.Y. PERM

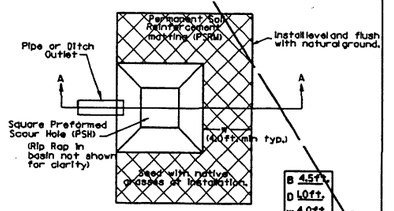
RETAIN

END CONSTRUCTION
-L- POT Sta. 22+25.00

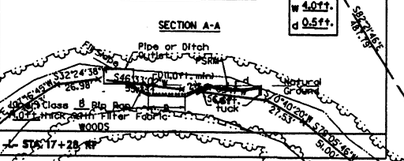
END STATE PROJECT T.I.P. B-4007
-L- POT STA. 21+75.00

DETAIL E
PREFORMED SCOUR HOLE

PLAN VIEW

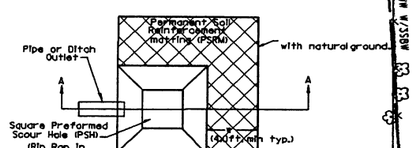


SECTION A-A

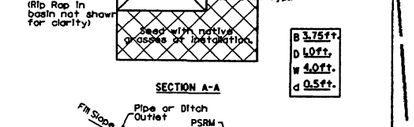


DETAIL C
PREFORMED SCOUR HOLE

PLAN VIEW

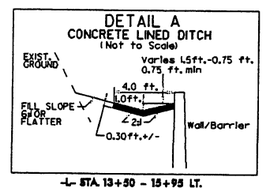


SECTION A-A



-L- STA. 16+55 LT, -L- 13+56 RT

DETAIL A
CONCRETE LINED DITCH
(Not to Scale)



-L- STA. 13+50 - 15+95 LT.

SEE SHEET 2B FOR TEMPORARY DETOUR

SEE SHEETS S- THRU S- FOR STRUCTURE PLANS

SEE SHEET 5 FOR -L- PROFILE

PLANS PREPARED BY :
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(919) 878-8560
FOR
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BILLY SMITH FARMS INC
DB 101 PG 438
TRACT 9

ROGER WILSON
DB 60 PG 281
DB 60 PG 223
DB 29 PG 490

JOSE VARELA
TERESA FERNANDEZ
DB 207 PG 741
PB 9 PG 92

BILLY HAWKS
ELAINE HAWKS
DB 198 PG 600

EUGENE EDWARDS
SHIRLEY EDWARDS
DB 69 PG 619

EUGENE E. EDWARDS
SHIRLEY N. EDWARDS
DB 64 PG 233

REVISIONS

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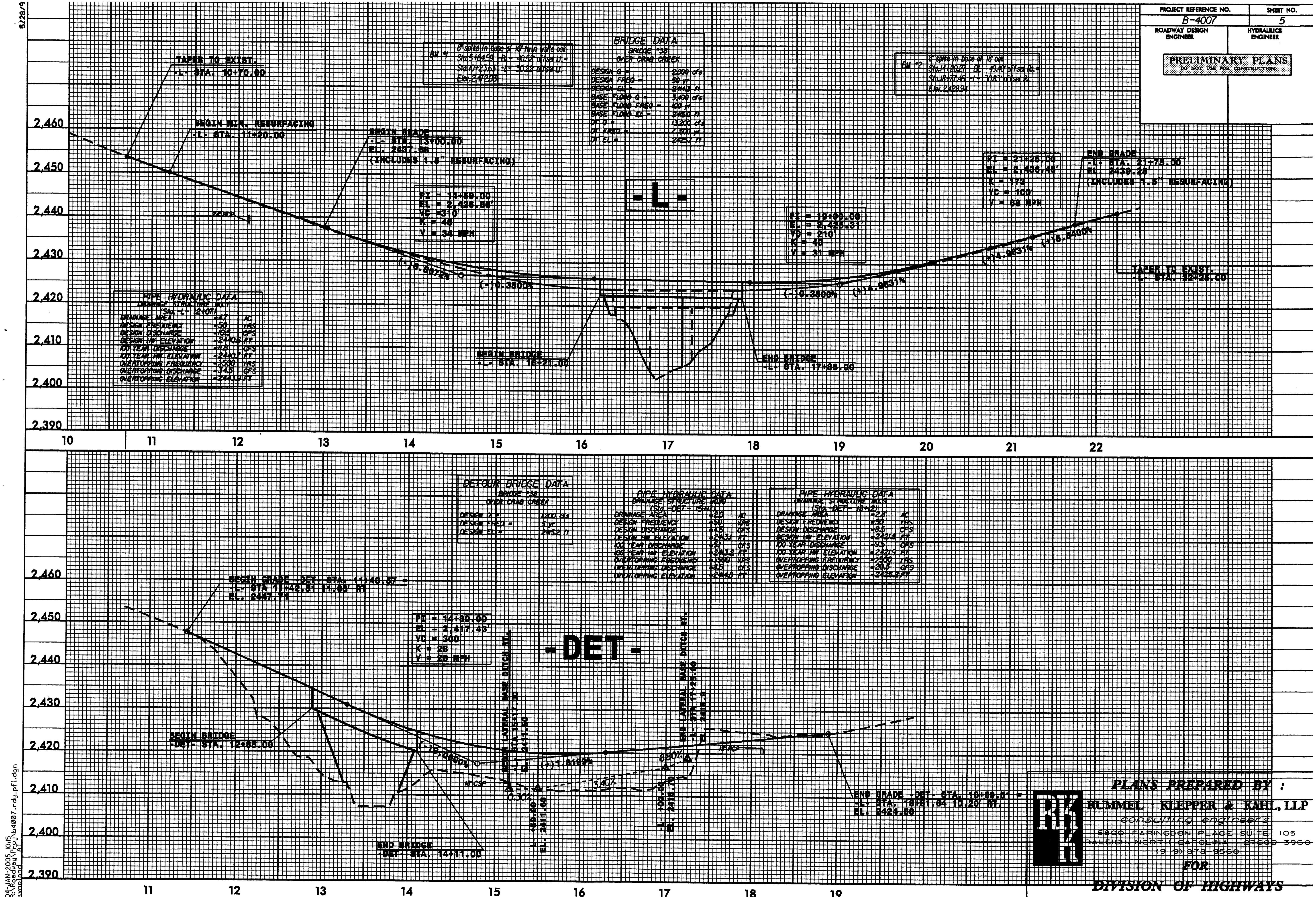
kyngland

PROJECT REFERENCE NO.	SHEET NO.
B-4007	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



BM #1	
	8" spike in base of 16" twin white oak
	Sta.5+64.59 -BL- 40.52' offset Lt =
	Sta.10+23.63 -L- 30.22' offset Lt.
	Elev. 2472.03

BM #2	
	8" spike in base of 18" oak
	Sta.14+20.27 -BL- 49.40' offset Rt. =
	Sta.18+77.46 -L- 30.83' offset Rt.
	Elev. 2428.94

BRIDGE DATA
BRIDGE #38
OVER CRAB CREEK

DESIGN Q =	2,800 cfs
DESIGN FREQ =	50 yr
DESIGN EL =	2444.3 ft
BASE FLOOD Q =	3,400 cfs
BASE FLOOD FREQ =	100 yr
BASE FLOOD EL =	2445.0 ft
OT Q =	13,200 cfs
OT FREQ =	2,500 yr
OT EL =	2425.7 ft

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.11
(Sta. -L- 12+07)

DRAINAGE AREA	=47	AC
DESIGN FREQUENCY	=50	YRS
DESIGN DISCHARGE	=105	CFS
DESIGN HW ELEVATION	=2440.6	FT
100 YEAR DISCHARGE	=118	CFS
100 YEAR HW ELEVATION	=2440.7	FT
OVERTOPPING FREQUENCY	=2500	YRS
OVERTOPPING DISCHARGE	=345	CFS
OVERTOPPING ELEVATION	=2443.9	FT

DETOUR BRIDGE DATA
BRIDGE #38
OVER CRAB CREEK

DESIGN Q =	1200 cfs
DESIGN FREQ =	5 yr
DESIGN EL =	2452 ft

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.10
(Sta. -DET- 15+10)

DRAINAGE AREA	=20	AC
DESIGN FREQUENCY	=50	YRS
DESIGN DISCHARGE	=45	CFS
DESIGN HW ELEVATION	=2413.1	FT
100 YEAR DISCHARGE	=51	CFS
100 YEAR HW ELEVATION	=2413.2	FT
OVERTOPPING FREQUENCY	=3500	YRS
OVERTOPPING DISCHARGE	=85	CFS
OVERTOPPING ELEVATION	=2414.8	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.9
(Sta. -DET- 18+(2))

DRAINAGE AREA	=28	AC
DESIGN FREQUENCY	=50	YRS
DESIGN DISCHARGE	=85	CFS
DESIGN HW ELEVATION	=2421.8	FT
100 YEAR DISCHARGE	=95	CFS
100 YEAR HW ELEVATION	=2421.9	FT
OVERTOPPING FREQUENCY	=2500	YRS
OVERTOPPING DISCHARGE	=20.3	CFS
OVERTOPPING ELEVATION	=2425.2	FT

PLANS PREPARED BY :

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RALEIGH, NORTH CAROLINA 27609-3960
919 878 9560

FOR

DIVISION OF HIGHWAYS

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PROJ. REFERENCE NO.	SHEET NO.
B-4007	X-1

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2480
2470
2460
2450
2440
2430
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2410

2451.72

11+00.00

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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8/23/94

0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4007	X-2

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11+50.00

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8/23/94

PROJ. REFERENCE NO.	SHEET NO.
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2490 2480 2470 2460 2450 2440 2430 2420 2410

2444.46

12+00.00

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2510
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12+50.00

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AT DS212417

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PROJ. REFERENCE NO.	SHEET NO.
B-4007	X-5

0 10

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2510
2500
2490
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2440
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2420
2410

2437.63

13+00.00

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AT DS212417

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PROJ. REFERENCE NO.	SHEET NO.
B-4007	X-6

0 10

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2510
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2490
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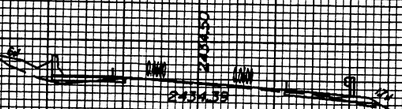
2410



15+50.00

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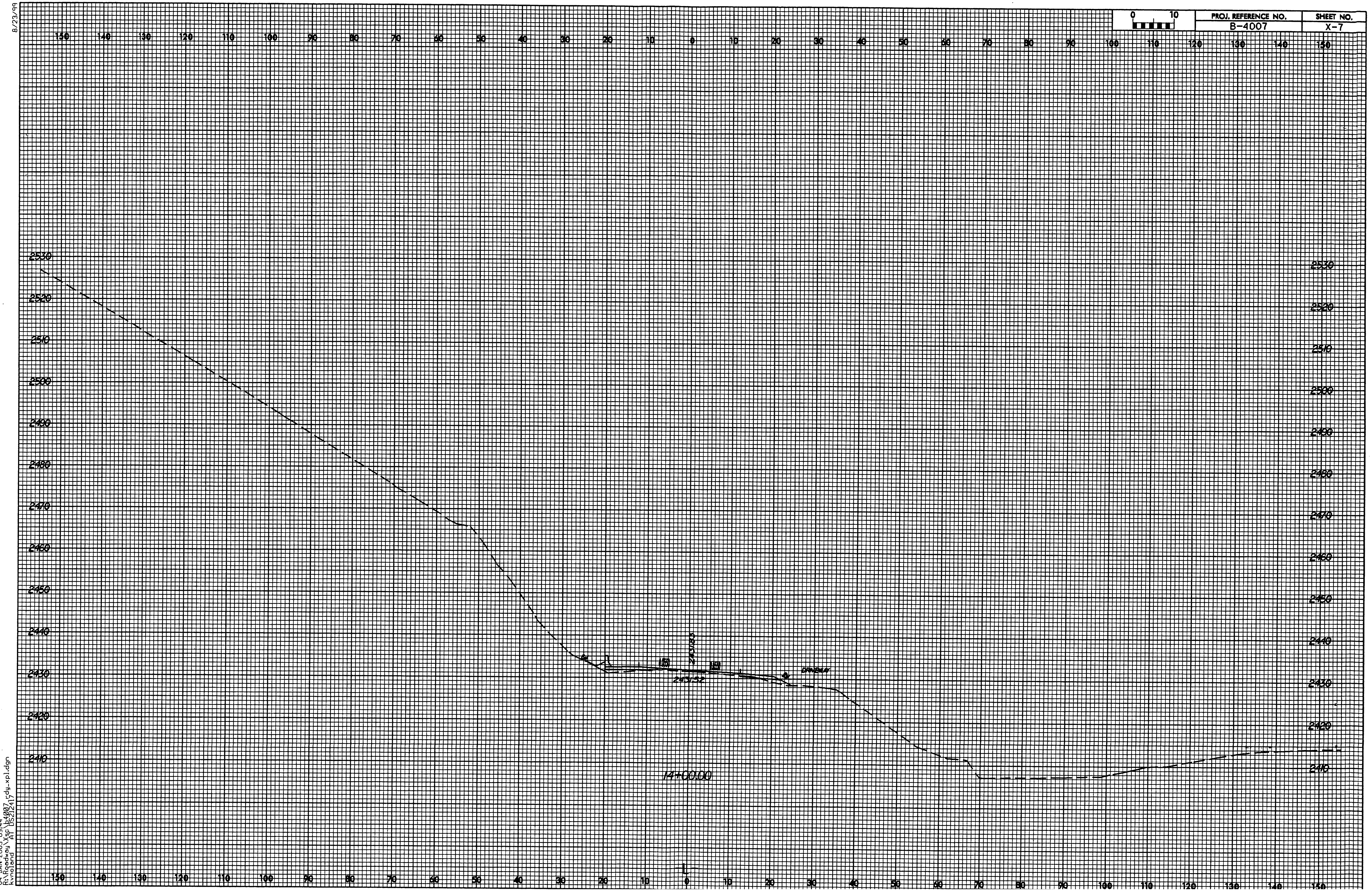
PROJ. REFERENCE NO.	SHEET NO.
B-4007	X-7



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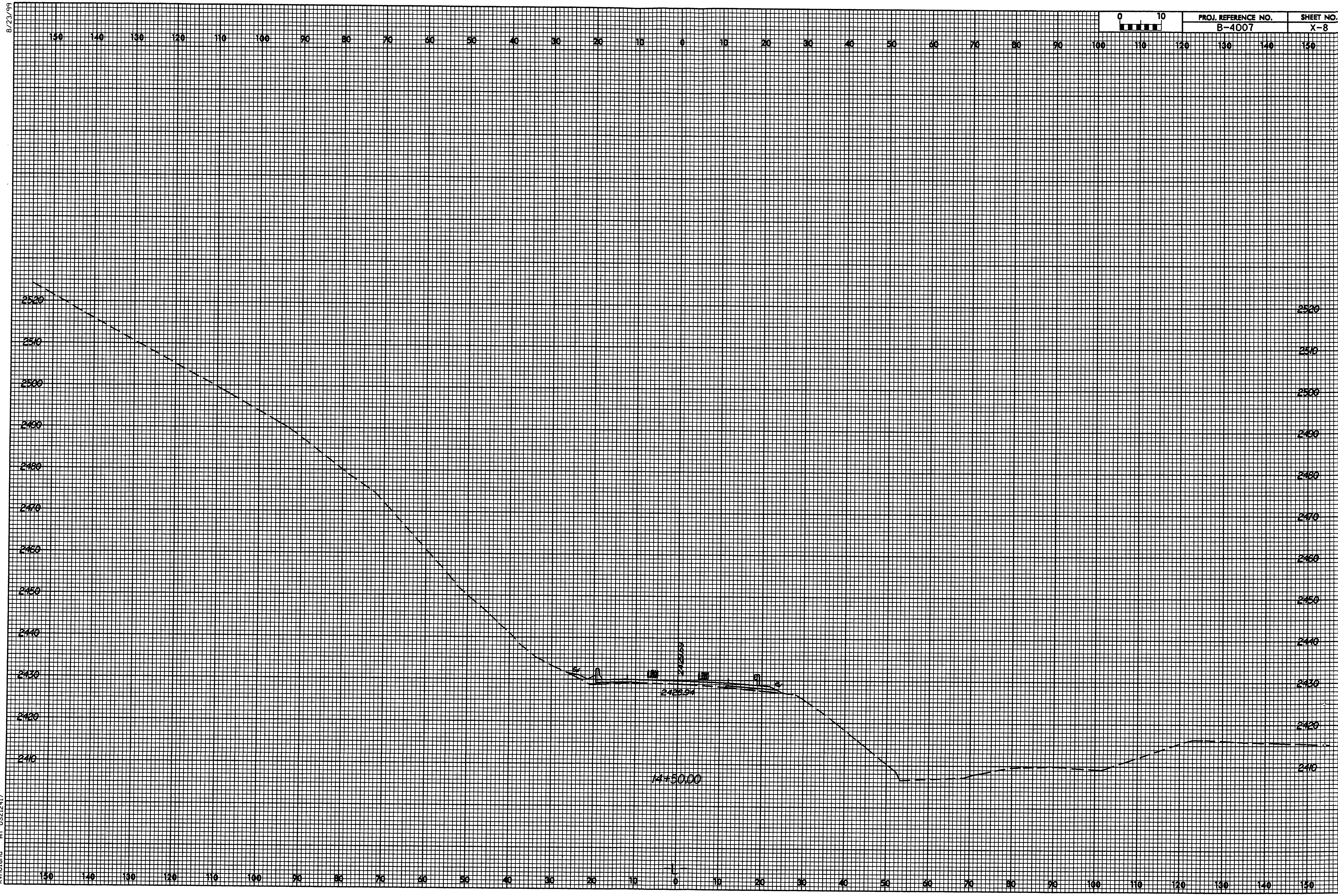
PROJ. REFERENCE NO.	SHEET NO.
B-4007	X-8



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kvnoland AT US212417

8/23/99

0 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4007	X-9

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2520
2510
2500
2490
2480
2470
2460
2450
2440
2430
2420
2410

2426.54

15+00.00

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AP 05212417

8/23/9

PROJ. REFERENCE NO.	SHEET NO.
B-4007	X-10

0 10

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

2510
2500
2490
2480
2470
2460
2450
2440
2430
2420
2410

2426.36
2424.98

15+50.00

L

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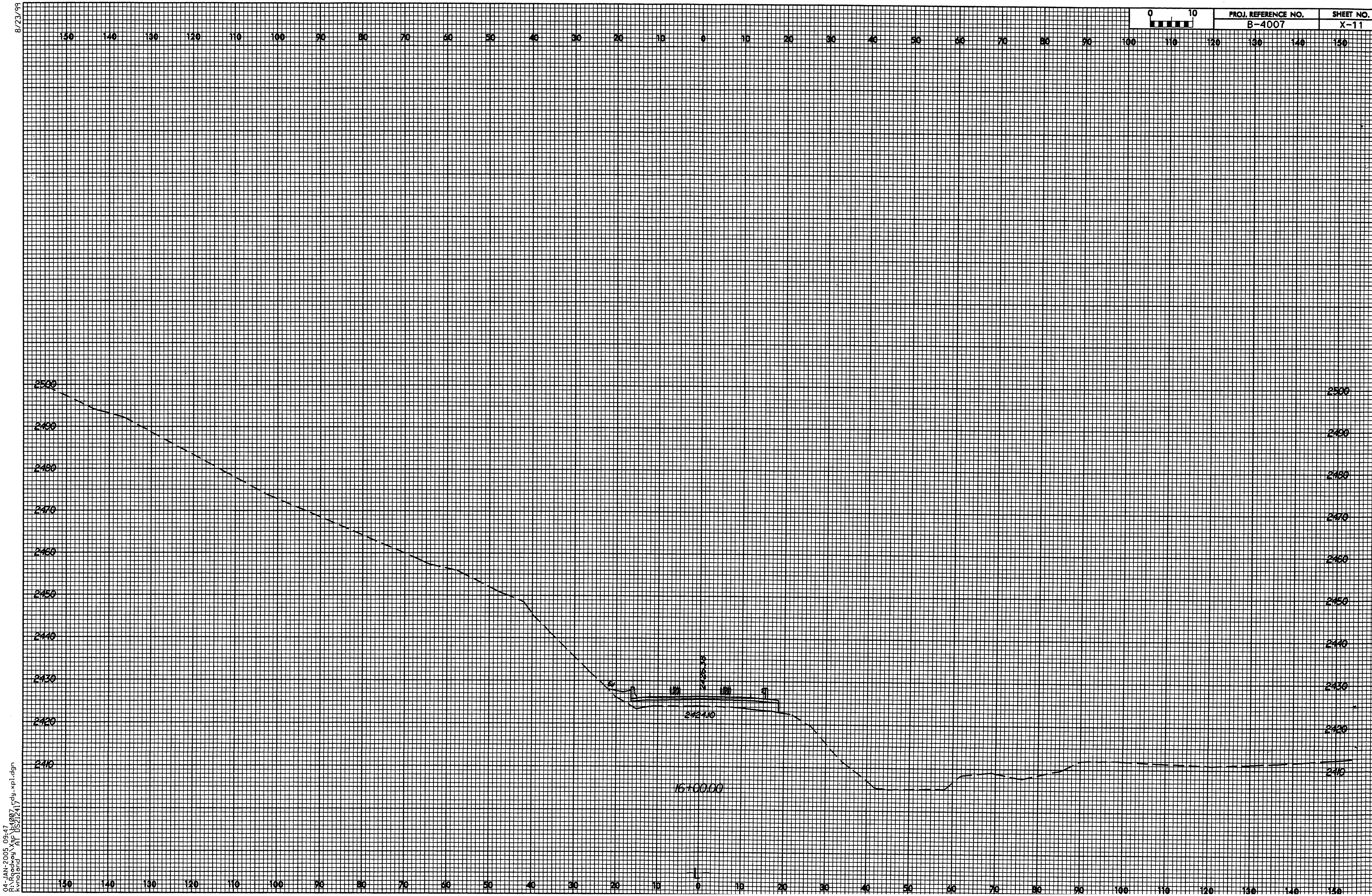
kvnoland
AT DS212417



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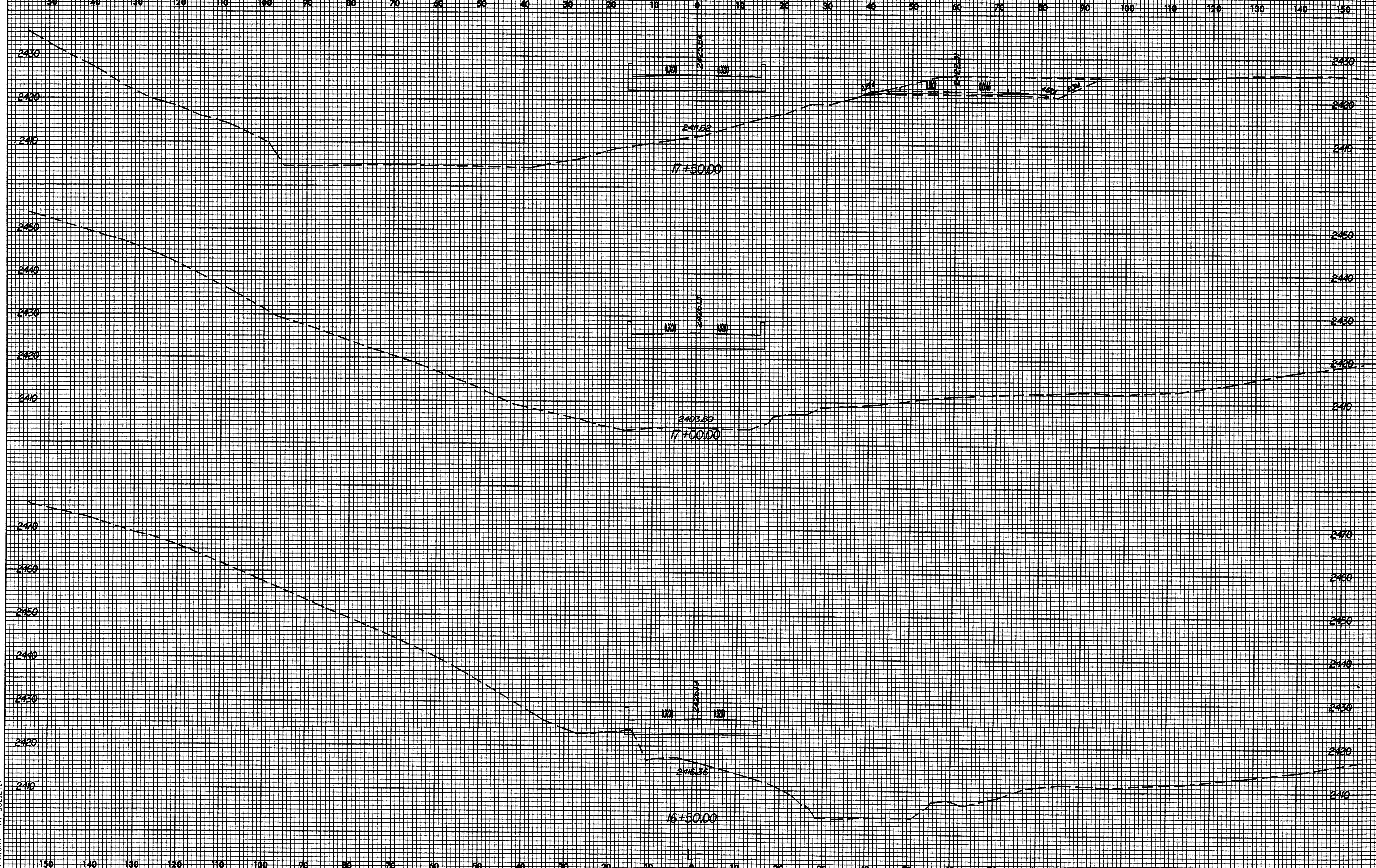

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kvnoland AT DS212417

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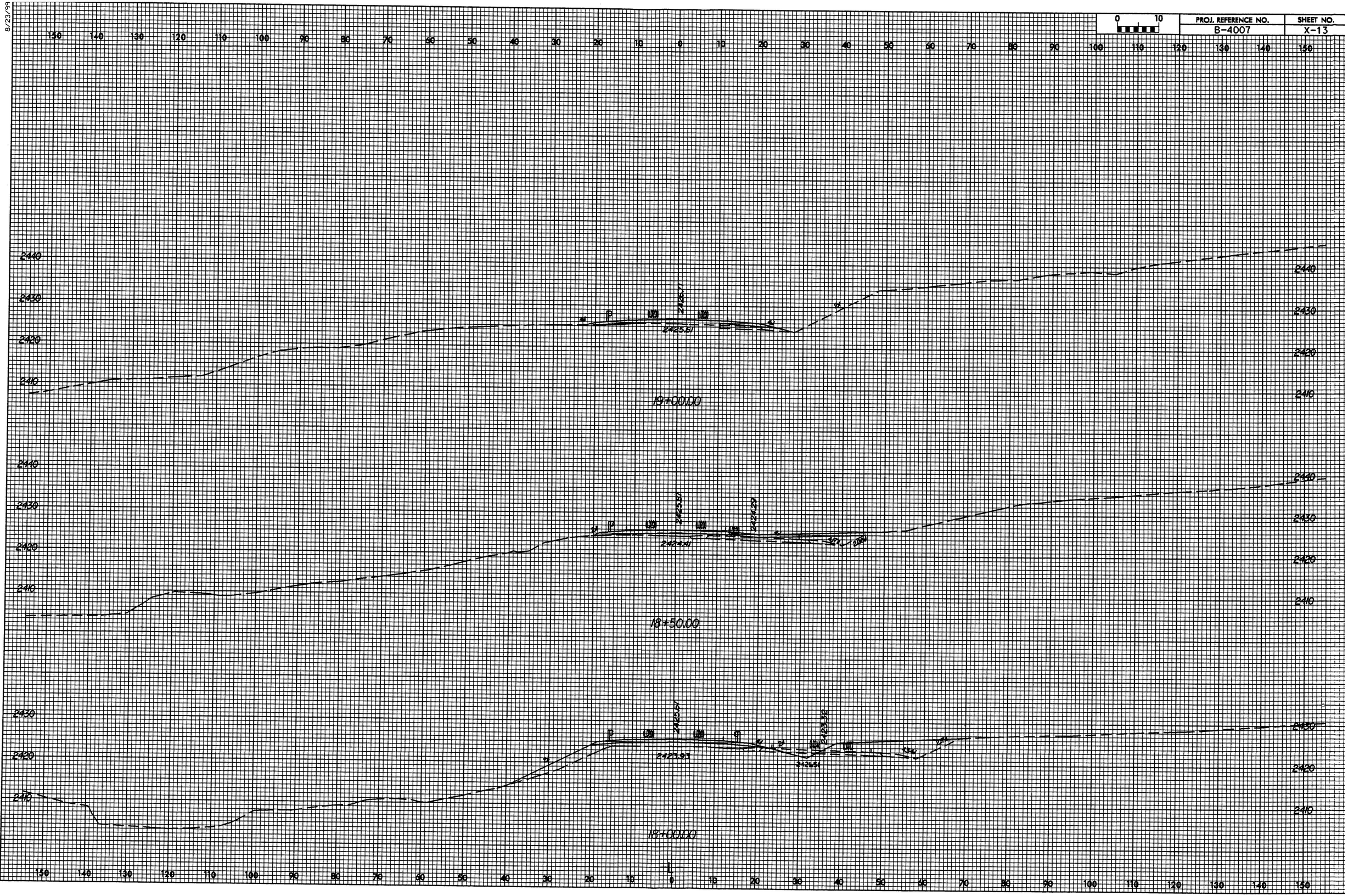

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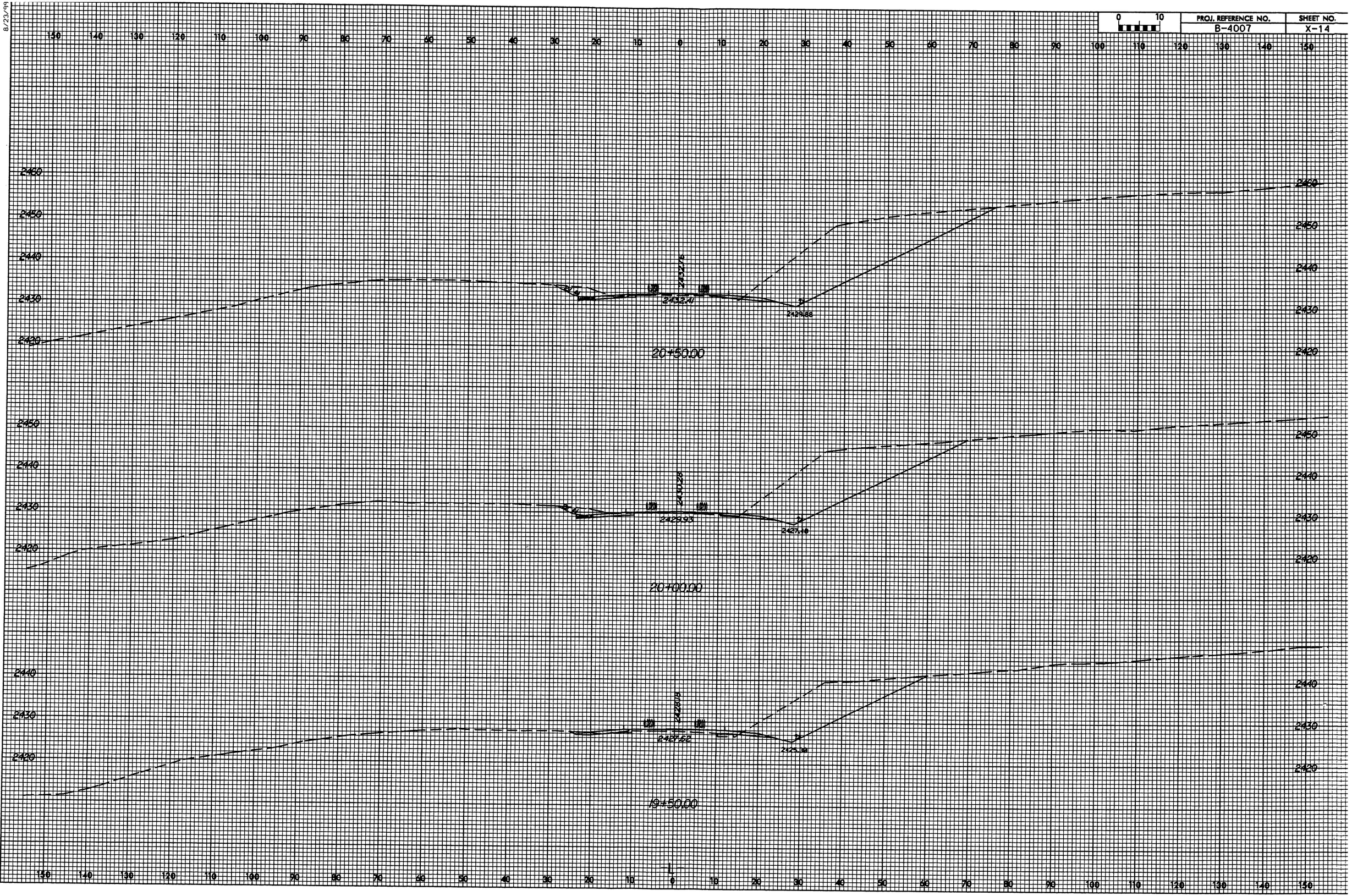

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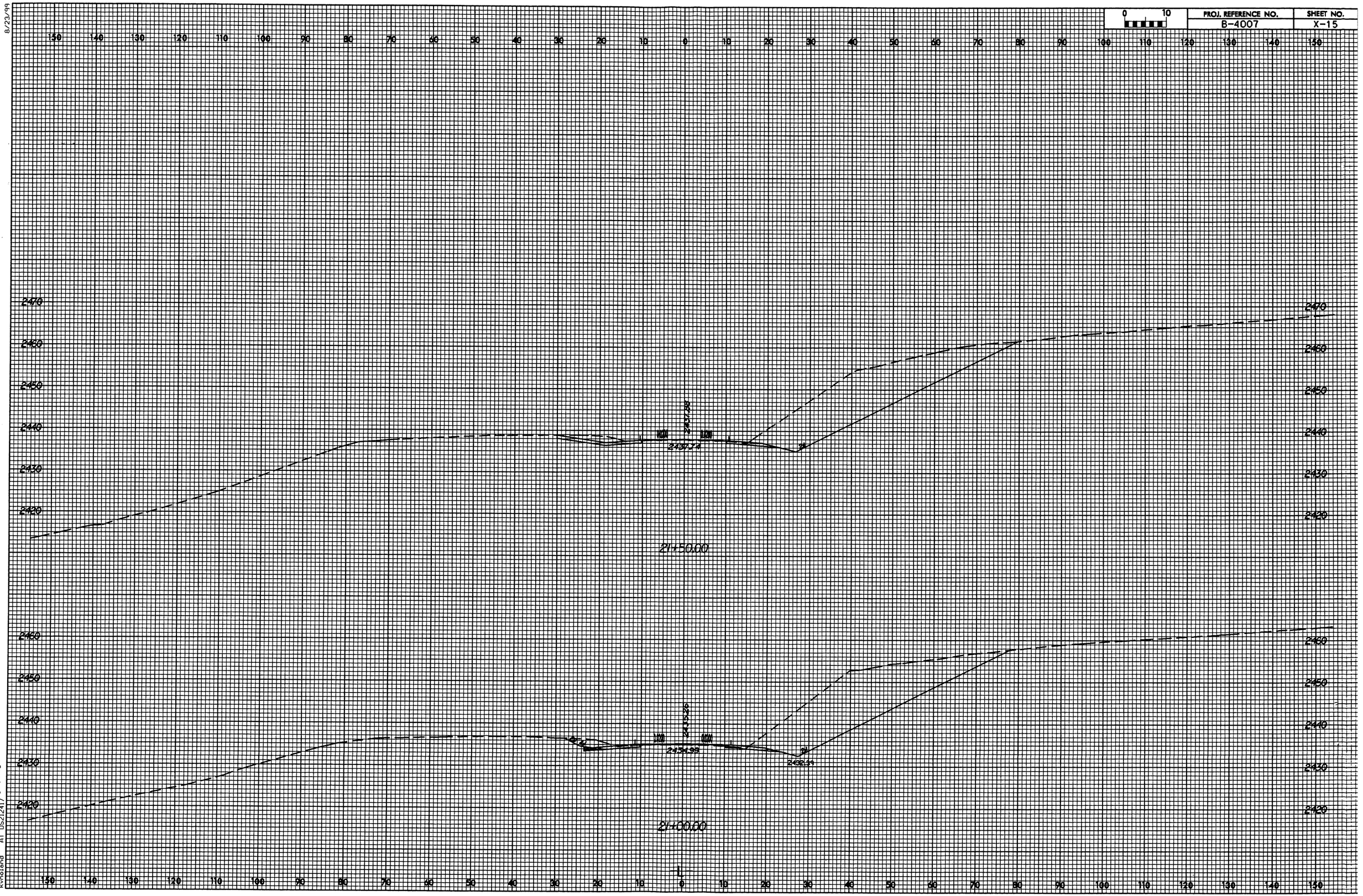

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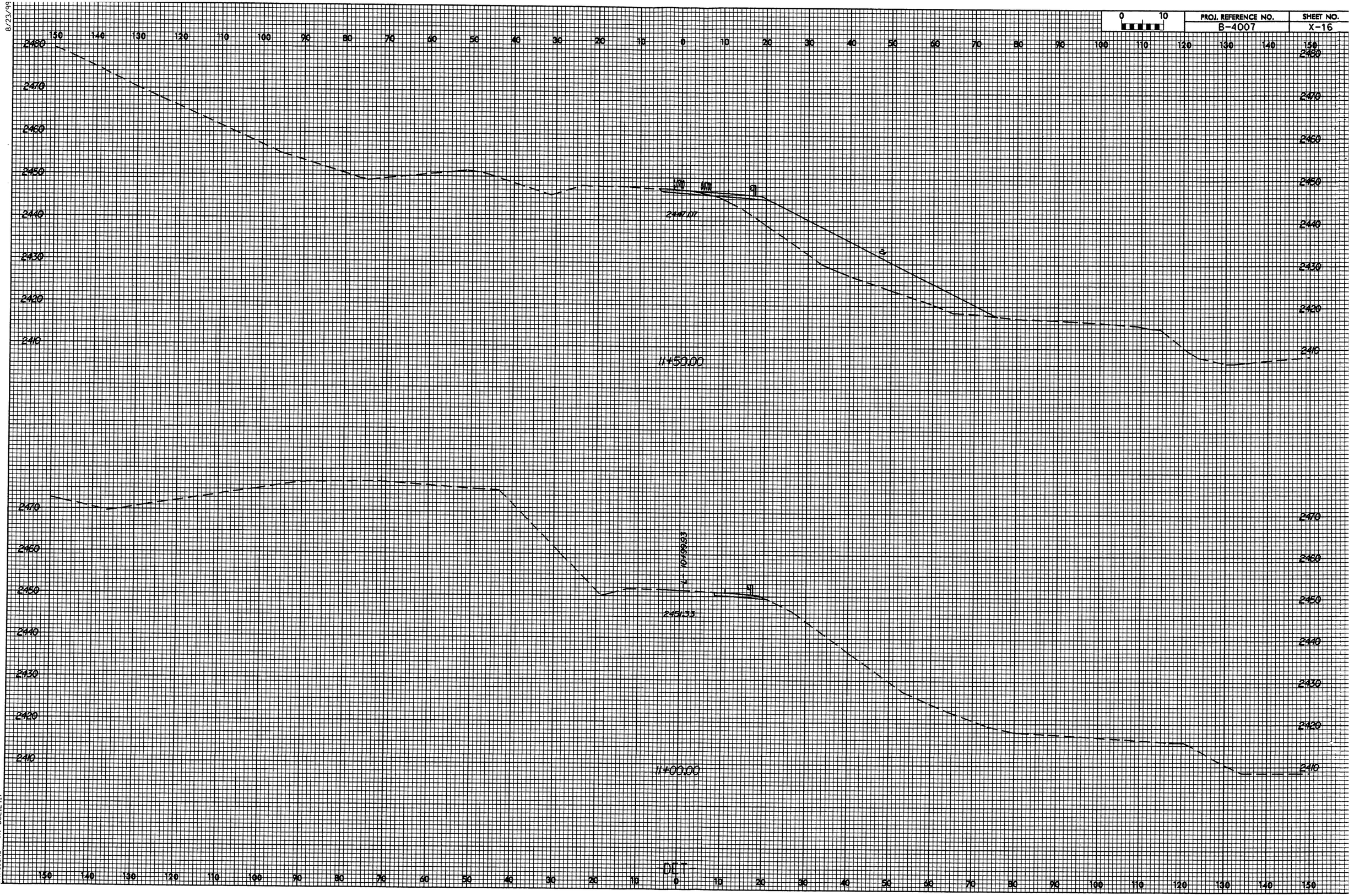

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8/23/94

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-DET-

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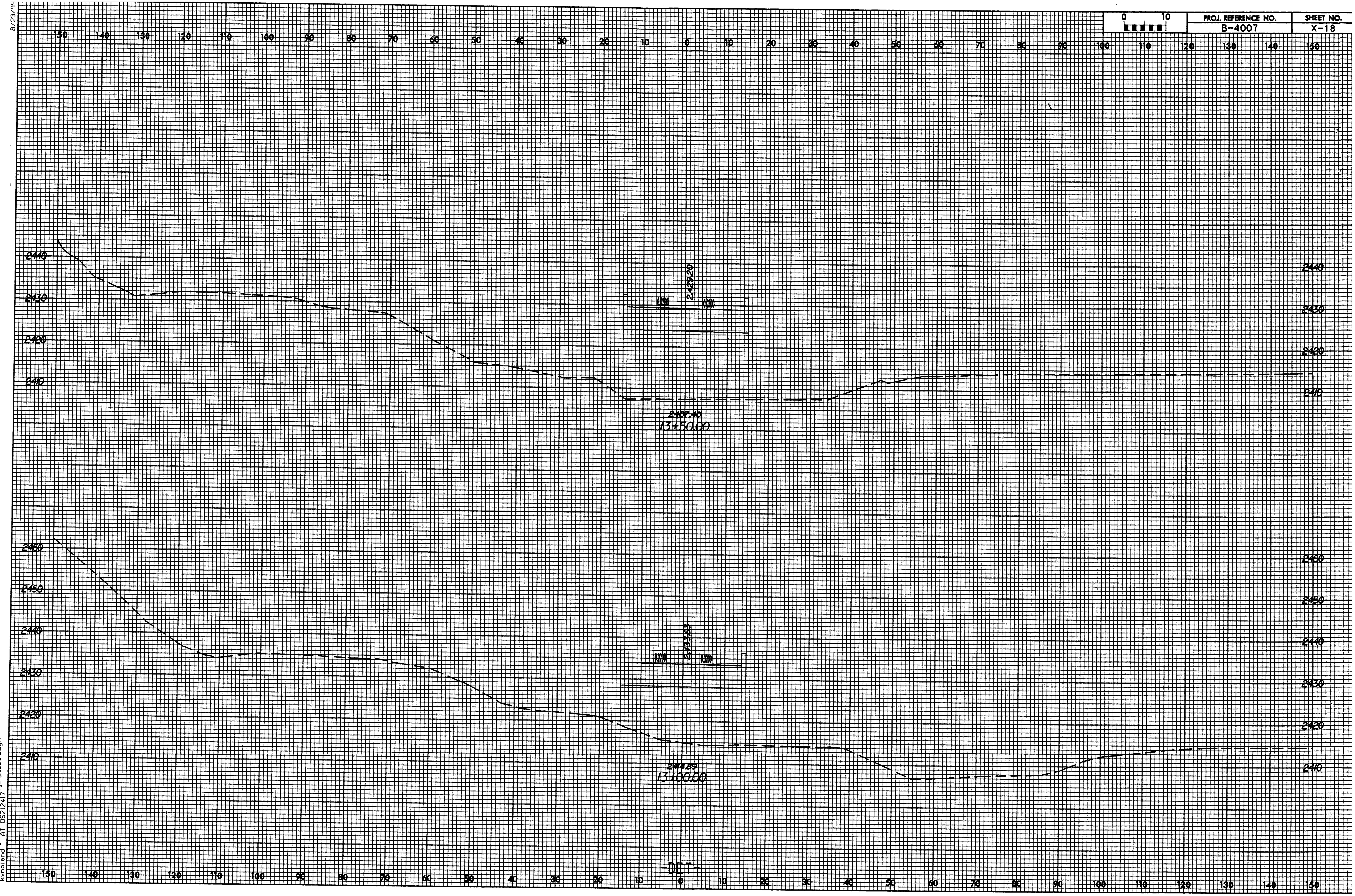

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8/23/95

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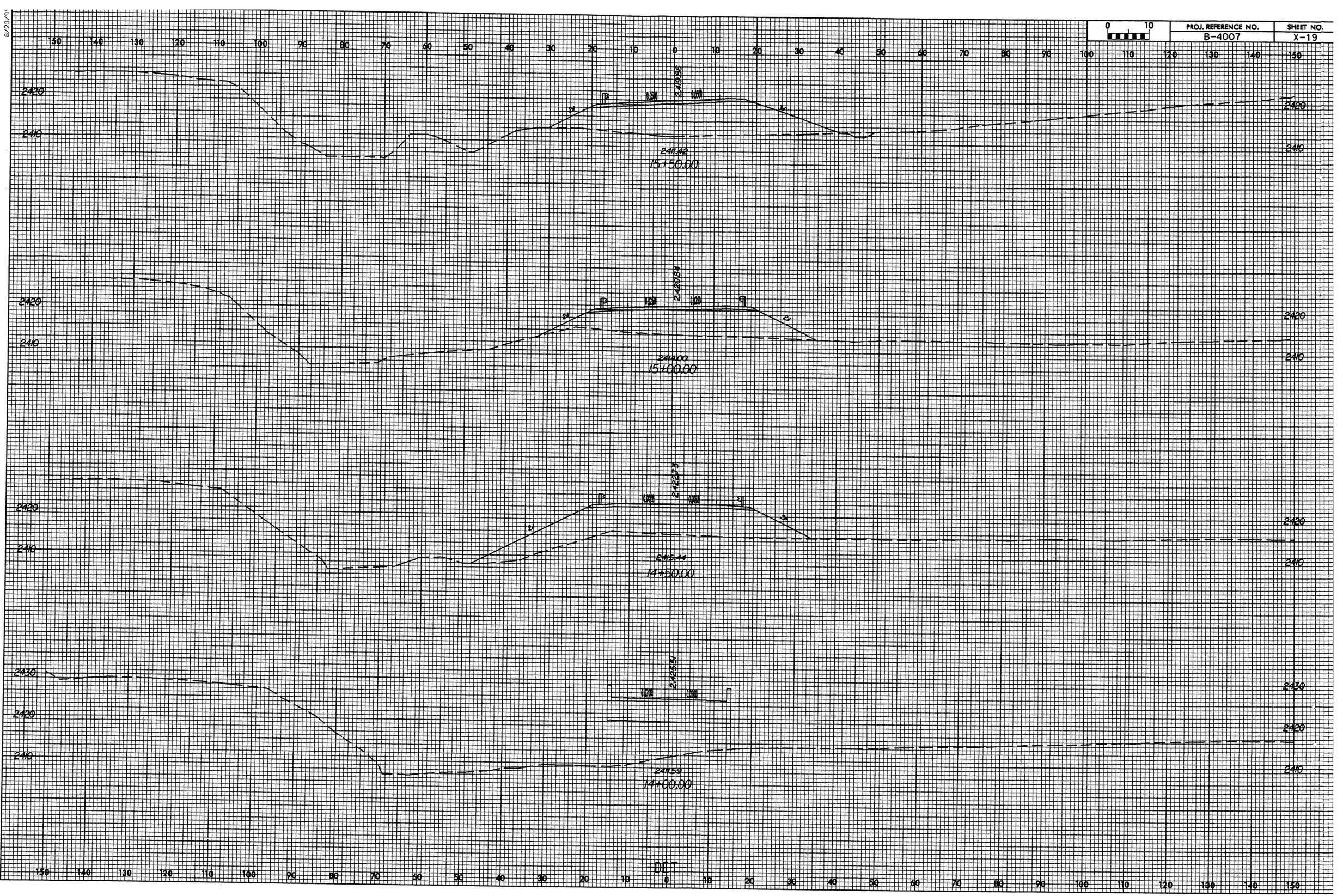

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PROJ. REFERENCE NO.	SHEET NO.
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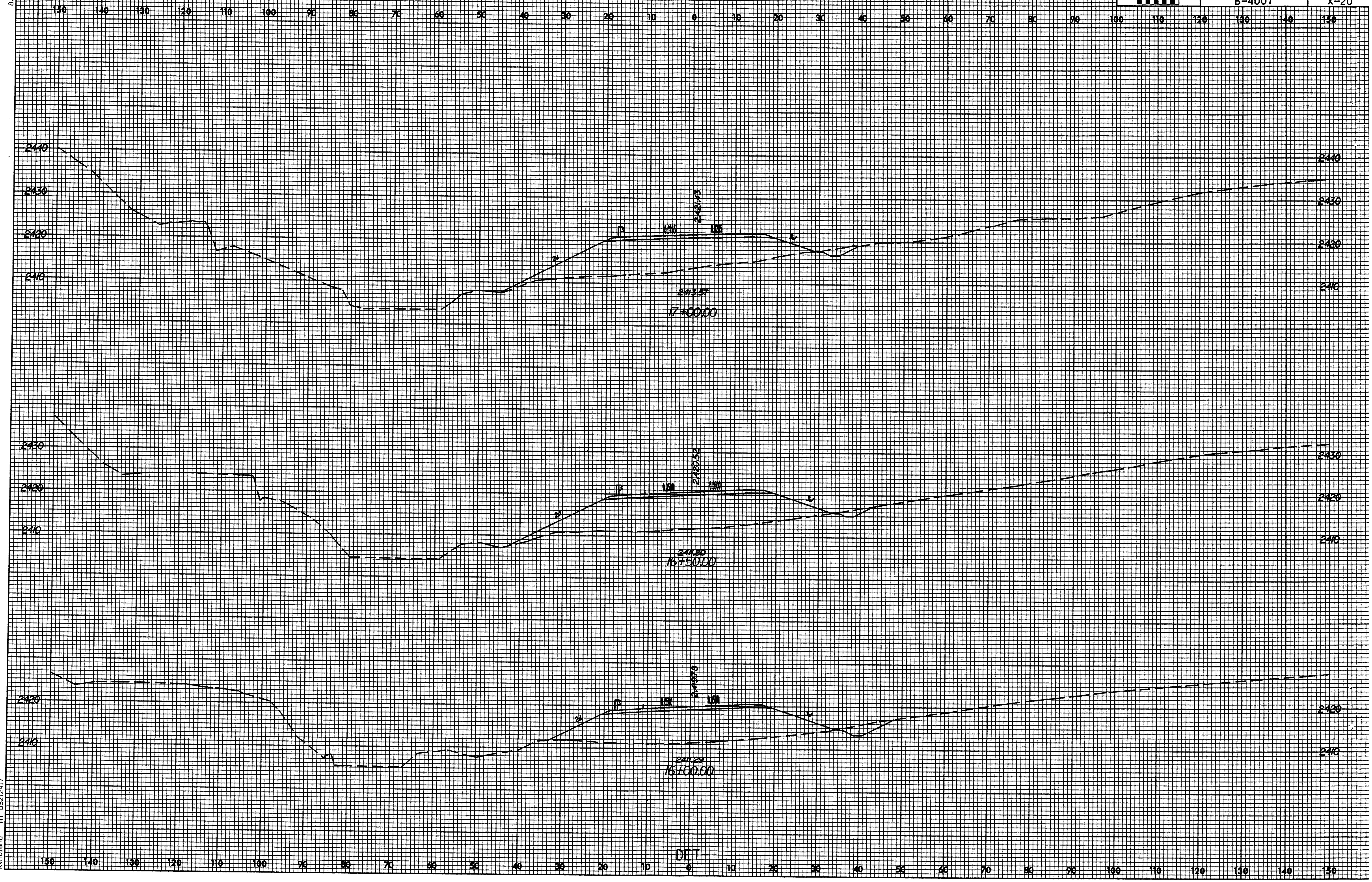

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Kvnoland AT US212417

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
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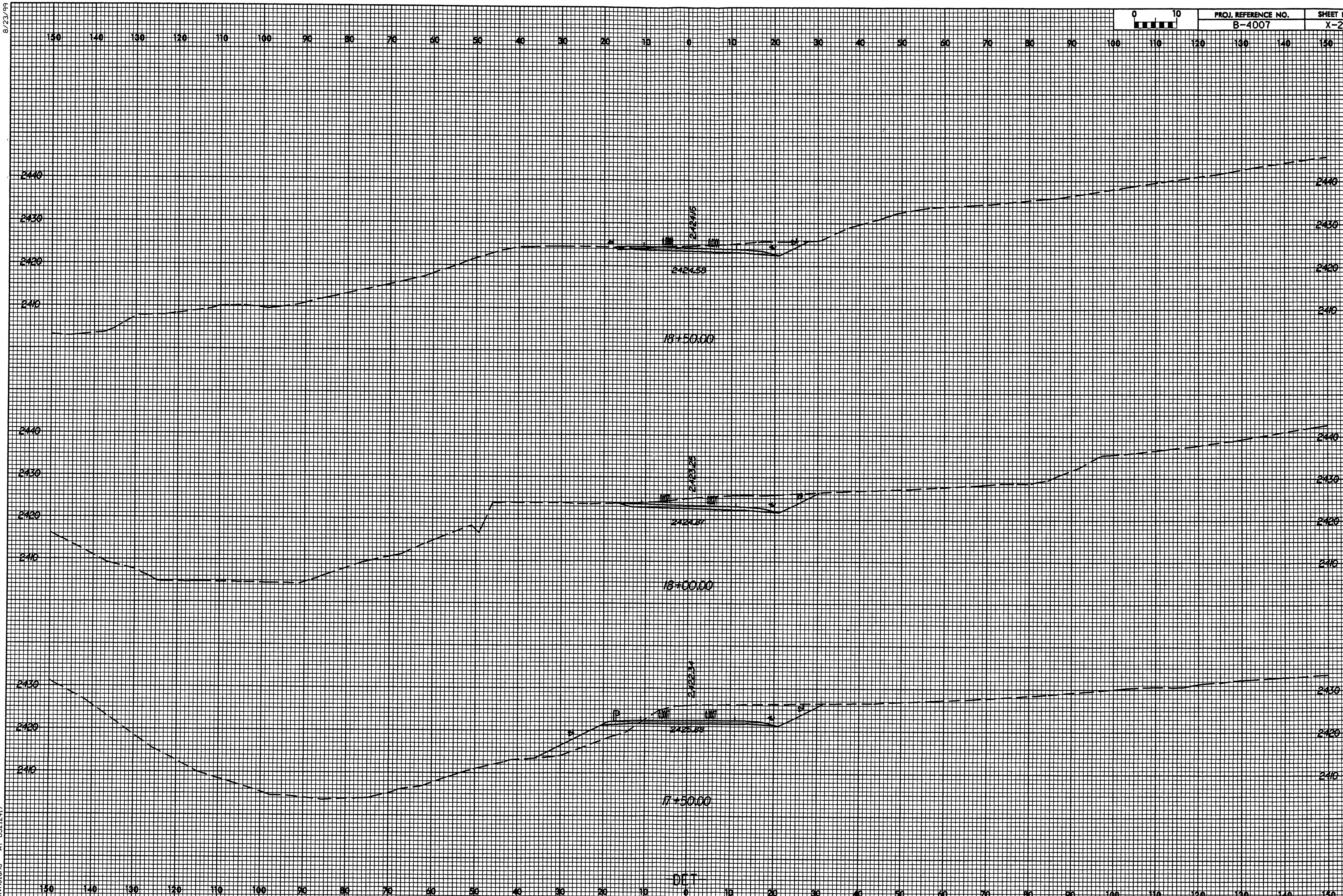

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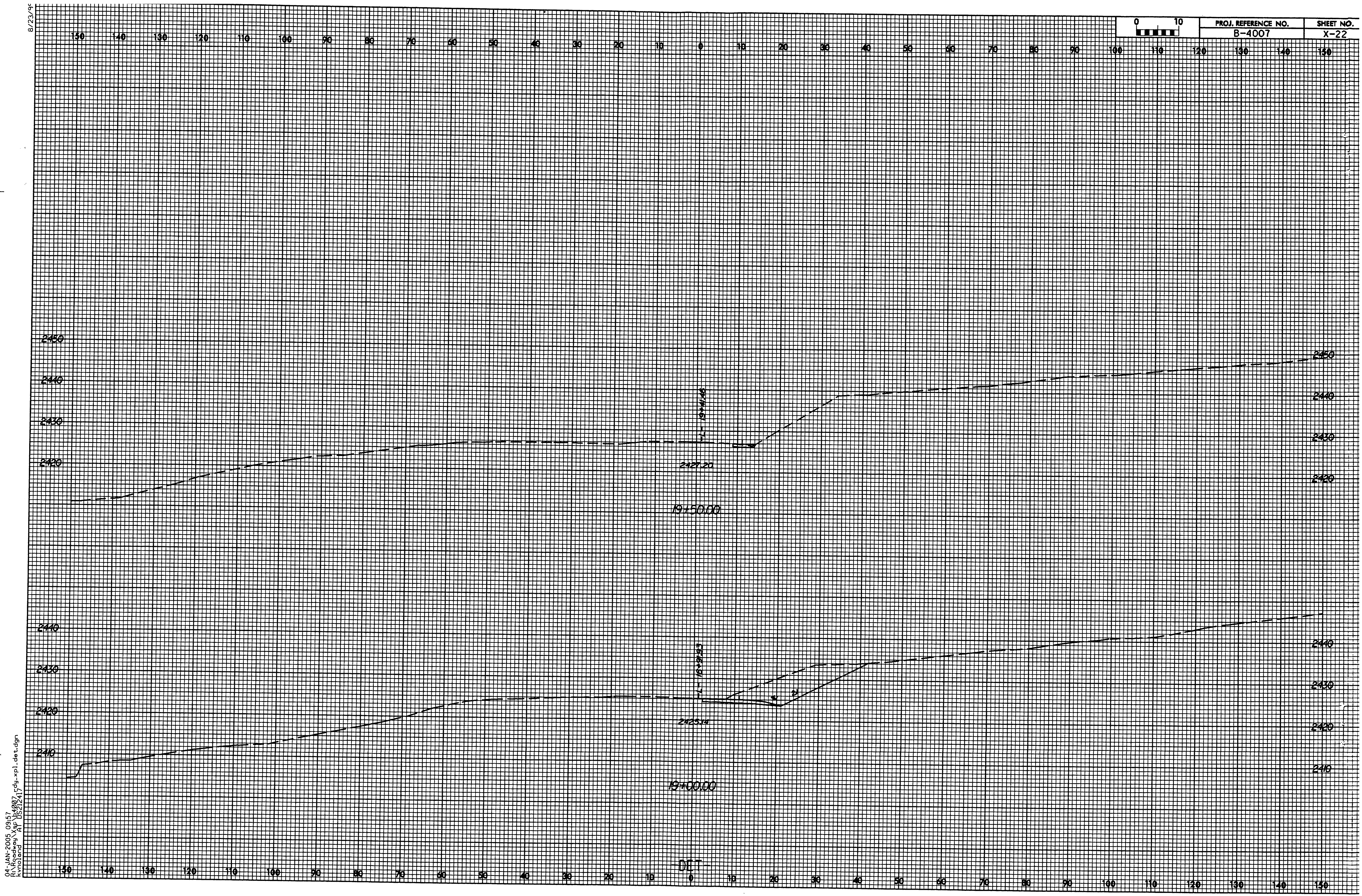

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